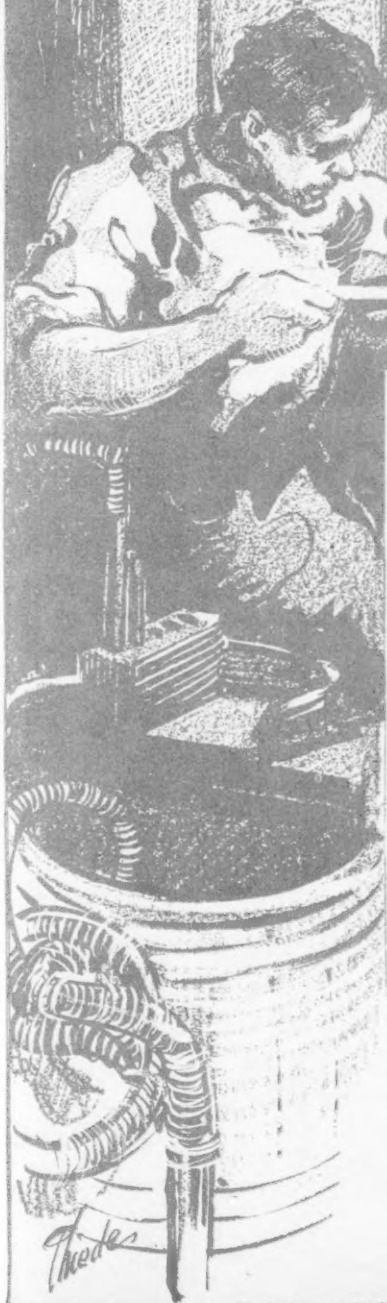


MOTOR AGE

FOOTPRINTS OF MASTER WORKMEN

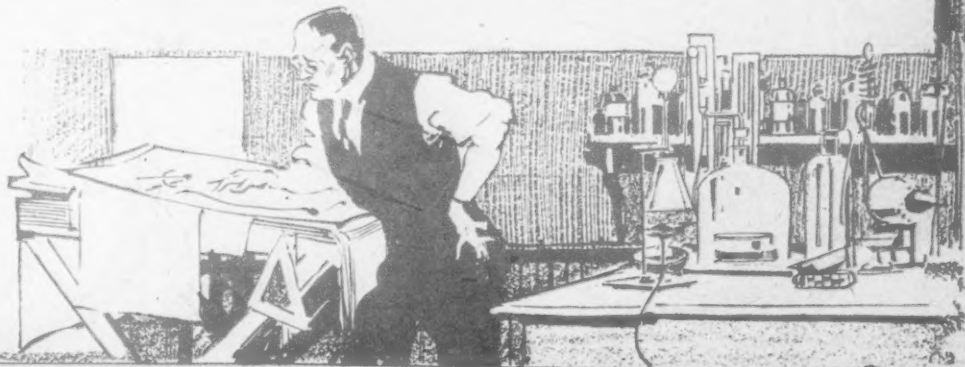


*Still we say as we go,
Strange to think by the way
That whatever there is to know,
That we shall know some day.*

WE are chaotic and there is a goodly amount of Darkness and Old Night still surrounding us. Somewhere there is a beaconlight—the ultimate goal of standardization to which all are aiming; no one knows its exact latitude or longitude in the scientific sphere; few know the direction from which the light emanates—some don't; those who do can at least be expected to develop along permanent lines; and those who don't are as children grasping after and working with the attractions of the moment, knowing not

whether they are steps leading to the ultimate goal which motor car design will some day be, or if they will be branded failures in a short season or two.

The day will never come when all motor cars will be identical, but that day will arrive when there will be a standard of bore and stroke for motor sizes which will be recognized as the most efficient for certain conditions. It would be as foolish to expect exact duplication in the multitudinous makes of cars as it would to expect the different races of the earth to duplicate one another in stature and emotional natures. The physical condition of the continents of this earth and the climates are in the end the





great determining factors of what shall, and what shall not be the accepted car construction. The car of France is not the car of America. The car of England is not satisfactory in the Argentine, and the car best suited for Germany is not the most successful in Australia. At present many manufacturers apparently conclude that a car satisfactory in one country is satisfactory in all countries. There is a good deal of flexibility about the motor car, but it is not omni-flexible; by a few changes it is possible to adapt it to the mountain and the plain, but it does not work to its best economy and efficiency when subjected to such widely varying fields of operation.

Chaos Is Historic

This chaos of manufacture is natural. It is the chaos that has accompanied every great revolutionizer of transportation or other industries since the early ages of civilization. It is that chaos which will continue until the final method is perfected. It is human to err, and it would be unnatural to expect a uniformity of design, or a coincidence of attainment in the early development of the industry. Today, one designer is going his way, another in the opposite direction. One may be right, the other wrong. The latter will eventually discover his mistake and correct his course. The variety of attainment is everywhere evident and all are apparently sincere to an extent in the course they are following. One concern has no confidence in anything but four-cylinder motors; another pins its entire faith to the six-cylinder type. This maker is engrossed solely in the production of a low-powered car; his neighbor places every stake on the high-priced article. One will fit nothing but

the multiple-disk clutch; another sees all merits tied up with the cone design. To one manufacturer the selective gear-set is the grand finale, or the acme of speed-changing achievement; to another the progressive set is equally appealing. One manufacturer waterjackets his carbureter; in an adjoining state his rival builder will have nothing of the kind. To one designer the tubular axle is perfection; in an adjacent city another engineer despises it. The combined transmission and rear axle answers to everything that is good in transmission design to one clique; another set sees only merit when the gear-set is a unit with the motor, and a third party will not do otherwise than mount it on the frame by itself. The high tension magneto is the satisfying portion of one class of manufacturers, whereas a rival group will have nothing but the low-tension type with the step-up transformer. Large-diameter wheels are considered economical by one set, whereas a medium size appeals to another community as being the more desirable.

Such is the chaos at present of the motor car, but it is gradually solving itself. And it will continue until the end. This chaotic situation will gradually work its own salvation through the process of elimination, this being the course that preceding industries have operated along. You cannot get a manufacturer to discontinue a certain design until it has either proven itself unreliable or unsatisfactory in comparison with others, or else the public has absolutely refused to have anything to do with it. Makers have, often to their own sorrow, followed the favorite bent of their engineering desires. Designs and constructions absolutely unexcusable have been thrust upon the buying public, but their life has been short, and in every case their

originators have been the losers. But year by year sees one design or another design relegated to the scrap heap of oblivion, and year by year sees some new conception born, which under the skill of the engineer and the trained hand of the artisan quickly evolves into a tangible and useful accessory of the motor car. Such are the steps of progress, all designs being tested, generally, by the unsympathetic public, and those found wanting being discontinued and those with merit incorporated as a part of what may become in future years the ultimate car.

The 1910 car is a more rational creation than that of previous years. There was a time when some cars might be designated bonnets, some wheelbases, and some angles. The car that was all bonnet or hood has disappeared. The car that resembled a Christmas eve shopper on his way home with arms filled with parcels is vanishing, and the car that was apparently designed with the object of making everything harmonize with a paltry whim of the designer has also ceased to be. The 1910 car in many cases is reasonably rational. In a few cases it is not. There are some cars on the market today with a steering wheel so close to the driver's seat that it is impossible to operate it without striking the hand against the knee—such cars apparently have been designed to suit a body whim rather than to be a car in the operating sense of the term.

The balanced car is coming: This is the car in which the motor has received its quota of attention; this is the car in which the designer has recognized that the chief object of its manufacture has been to transport people and that these people should be made as comfortable as possible when in the car; this is the car in which

some facilities, at least, for carrying baggage have been arranged, so that the suit cases are not falling over the feet of the tonneau passengers or hanging out in the mud on the running board; and this is the car in which there has at least been an attempt made to provide adequate provision for the various tools and parts needed in connection with the motor and tires, so that it is no longer necessary, if a puncture has to be repaired, to have all the tonneau passengers get out, drop the tonneau cushion on the side of the road, scatter the storm curtains over the backs of the front seats and remove every tool and part carried for the simple object of getting out a jack or tire pump. The balanced car is one with sufficient gasoline accommodation for a day's journey and in which the lubricating means for the motor are adequate for 200 miles, in some cases 500, so that it is no longer necessary to have to fill up in the course of a day's travel.

Looking for Accessibility

Although the rational car and the balanced car are at hand, it is questionable if the accessible car has made the progress it should have made in the last year. So great has been the demand for cars that many buyers have accepted anything rather than do without. Accessibility, too, is a point little talked by the salesmen and rarely if ever enters the mind of the buyer. If it does come to his attention the salesman is quick to remark that if the water pump is not get-at-able that it never gives trouble; and that if the carbureter is somewhere between the mainframe and sideframe members that it never has to be adjusted; that if there is no marking on the flywheel to



assist in timing the valves they never have to be timed because of the simplicity of construction. These sound well, but that car has not yet been made which does not eventually reach the repair shop, and it is when it gets into the repair shop that accessibility counts and counts in dollars and cents. A case came up in a western city within the last month, in which it was necessary to remove the mud apron from a certain make of car. The owner considered this a very trivial affair, but what was his consternation when learning from the repair man that this mud apron was actually riveted to the side members of the frame, and that before it could be taken off the motor would have to be lifted out and the dash removed as well. It costs money to remove a motor and take a dash off, when with a little accessible construction, comprising a hinge or two and an automatic fastener, the work might be accomplished in a few minutes and without the car ever reaching the inside of a repair shop.

All Want Accessibility

The accessible car will prove to be the popular car. With one manufacturer if a simple adjustment of the rear brakes has to be made he must get on his knees on the road in order to do it and then runs the risk of mixing up with the grease and dirt of the chassis frame and parts. Unless he is properly prepared for such work there will be destruction of his clothes—this means money—and more than likely the operation will result in an alarming sacrifice of patience. One manufacturer builds a motor in which the oil cannot be drained from the crankcase without taking off the base of the case, and which base cannot be removed until the

mud apron is taken off, and which mud apron cannot be taken off without removing from twelve to twenty stove bolts which anchor it to the frame. Once more, it is evident that from such constructions as this that the accessible car is not yet with us and that inaccessibility is most costly, not in the original price of the car, but in every instance in which that car enters the repair shop for matters however slight.

The great problem of the long-stroke motor is little nearer settled for the time being than it was a year ago. The number of cars in which the cylinder bore is in excess of the cylinder stroke is fewer than a year ago. An accurate average of the different makes of cars on exhibition at the Grand Palace shows that the stroke is $\frac{1}{4}$ inch longer than the bore. This does not mean the long-stroke motor however, although there are individual examples which are almost deserving of the title, in that the stroke ranges as high as $\frac{3}{4}$ or $1\frac{1}{8}$ -inch in excess of the bore.

Buyers may ask why the question of long stroke versus short stroke has not been settled. The answer is brief: The American designer is too busy a man and has not enough time for research and testing to settle such momentous questions in a year. In not a few factories the engineer is the busiest man on the pay roll, or on the board of directors if he is so fortunate as to be so honored. He is considered capable of being a superintendent for all the heads of departments; he is supposed to keep in touch with the desires of the great-buying public; he is supposed to assist in the executive end of the factory management; he is supposed to superintend the drafting department; he is supposed to be a metallurgist; he is supposed to be a student of tire problems; in fact, he is supposed to be



the all-in-all, and if anything goes wrong he is the first to be censured. As a result of these multitudinous duties his time for research is practically nothing, in fact, some of our ablest engineers put in from 1 to 2 hours per day longer than the man at the lathe, at the drill, or at the milling machine. It is impossible to expect engineers under such conditions to quickly solve the problems that confront the industry at the present time.

This overworked condition of the engineers and manufacturers is being discontinued by some of the best makers, and as a result such concerns are making real progress, and this real progress means economy at the end of the year, and it means a car which is nearer the ultimate design than that of previous models.

Price can scarcely be considered a criterion of design when engineering progress is concerned. What was true a year ago is proving true at the present time, namely the fact that not a few of the new concerns have exploited designs which the makers of high-priced machines have been compelled to imitate at a later date. Indeed, it is practically a recognized fact that the real work of development is taking place in the smaller-car field today and that in this field problems are being solved that will eventually effect the manufacture of the higher-priced article. Some of our most reliable cars are not considered best in some respects from an engineering point of view, but yet with their present constructions they give that essential measure of success and they are being continued in their present form.

The light-weight car has not progressed as rapidly as was expected, although not a few makers have succeed-

ed in cutting a few hundred pounds out of the chassis and running gear, so that for next season their tire bills will be considerably reduced, a commendable condition in view of the soaring prices of rubber at the present time. The light car is bound to come for more reasons than that of tire economy. A light-weight car is easier on all of its own parts than a too-heavily designed machine. The light car consumes less of the motor to move it around and so greater power efficiency is obtained without adding a moiety to the power of the motor.

Comfort Is Essential

The comfortable car is approaching and in a few cases has arrived. All cars should be comfortable, but how many of the mare not. One design that administers to the tonneau passenger comfort is suspending the body between the axles, so that the whip which invariably takes place behind the rear axle is avoided. Some of the tonneau cars are now designed that the passengers have ample foot room to enjoy an all-day trip with a measure of comfort; but in several of the toy tonneau machines there is not enough room for the feet and an all-day trip in them would be a continual torture after the first few hours. Makers are realizing that the front seat passengers require comforts and the torpedo body has already done much to improve their lot. The high doors stop the cross currents and add materially to the appearance of the car. In another year every maker will have his torpedo type of body and it is to be hoped that they will place the change speed and emergency brake levers inside the body if for no other reason than appearance sake.

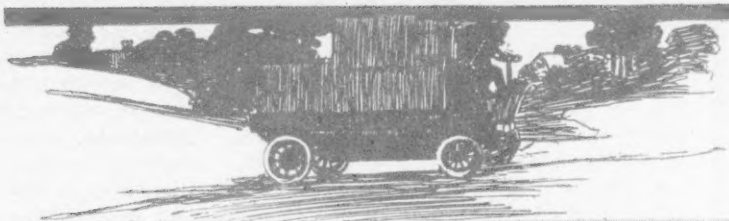


EXHIBITORS

Motor Cars

Allen-Kingston Motor Car Co. New York
 American Motor Car Co. Indianapolis, Ind.
 American Motor Co. Brockton, Mass.
 American Motor Truck Co. Lockport, N. Y.
 Atlas Motor Car Co. Springfield, Mass.
 Bartholomew Co. Peoria, Ill.
 B. C. K. Motor Co. York, Pa.
 Black Mfg. Co. Chicago
 Bowman Automobile Co. New York
 Brewster & Co. New York
 Brush Runabout Co. Detroit, Mich.
 Buckeye Mfg. Co. Anderson, Ind.
 C. G. V. Import Co. New York
 Cartercar Co. Pontiac, Mich.
 Courler Motor Car Co. Dayton, O.
 Cameron Car Co. Beverly, Mass.
 Carlson Motor and Truck Co. Philadelphia, Pa.
 Chadwick Engineering Works. Pottstown, Pa.
 Chase Motor Truck Co. Syracuse, N. Y.
 Coates-Goshen Co. Goshen, N. Y.
 Columbus Buggy Co. Columbus, O.
 Cole Motor Car Co. Indianapolis, Ind.
 Crawford Automobile Co. Hagerstown, Md.
 Dayton Motor Car Co. Dayton, O.
 DeDion-Bouton Selling Branch. New York
 Delahaye Import Co. New York
 Demotcar Sales Co. Detroit, Mich.
 Empire Motor Car Co. Indianapolis, Ind.
 Fal Motor Co. Chicago
 Fiat Automobile Co. New York
 Ford Motor Co. Detroit, Mich.
 Gaeth Automobile Co. Cleveland, O.
 Grabowsky Power Wagon Co. Pontiac, Mich.
 Gramm-Logan Motor Car Co. Bowling Green, O.
 Hart-Kraft Motor Co. York, Pa.
 Hol-Tan Co. New York
 Hotchkiss Import Co. New York
 Hupp Motor Car Co. Detroit, Mich.
 Inter-State Automobile Co. Muncie, Ind.
 Isotta Import Co. New York
 Jackson Automobile Co. Jackson, Mich.
 Jewel Carriage Co. Carthage, O.
 Kissell Motor Car Co. Hartford, Wis.
 Lansden Co. Newark, N. J.
 Lion Motor Car Co. Adrian, Mich.
 McCue Co. Hartford, Conn.
 McIntyre Co. W. H. Auburn, Ind.
 Mack Bros. Motor Car Co. Allentown, Pa.
 Martin Carriage Works. York, Pa.
 Maxwell-Briscoe Motor Co. Tarrytown, N. Y.
 Metz Co. C. H. Waltham, Mass.
 Metzger Motor Car Co. Detroit, Mich.
 Midland Motor Co. Moline, Ill.
 Middleby Auto Co. Reading, Pa.
 Mitchell Motor Car Co. Racine, Wis.
 Moline Automobile Co. East Moline, Ill.
 Moon Motor Car Co. St. Louis, Mo.
 Mora Motor Car Co. Newark, N. Y.
 National Motor Vehicle Co. Indianapolis, Ind.
 Nordyke & Marmon Co. Indianapolis, Ind.
 Oakland Motor Car Co. Pontiac, Mich.
 Otto Sales Co. W. S. Jones. Philadelphia
 Paige-Detroit Motor Car Co. Detroit, Mich.
 Palais de l'Automobile. New York
 Panhard & Levassor. New York
 Patterson Co. W. A. Flint, Mich.

Work of Preparing Show Detail A Gigantic Task In Itself



By R. E. Olds, Chairman Show Committee A. M. C. M. A.

EIGHT months of time and energy, thousands of dollars and a great amount of detail work have been necessary to give the cars and accessories their rightful setting for the palace show. Three months before the opening every available square foot of floor space was sold, and even now there is a waiting list, with each delinquent applicant hoping that someone may withdraw at the eleventh hour.

At no time in the history of motor car shows has there been such an overwhelming demand for space as this year. It would have been an easy matter to have sold from 35,000 to 50,000 additional square feet of exhibition space. It was necessary for the show committee to cut down the space usually used for the executive offices and press rooms to let in a few extra exhibitors. As a matter of fact no building in New York, and that means in the United States, is large enough to accommodate the products of all the car builders who wish to display their models.

This year in the palace show practically every exhibitor is restricted to smaller quarters with his latest models than he would occupy were space unlimited, and the matter of space has become a difficult problem to solve by the show committee.

To the outsider who is not connected directly with the industry it is a matter of wonderment on his part what has caused the motor car show to have such a strong hold upon the public and to act as such a drawing card to all classes.

Shows are yearly increasing in popularity and there is no question but that they have become a fixture. The manufacturer, the dealer and the public demand them. The show has become such an important factor that it ranks with the theaters in appealing to the masses, and theater managers say that during the motor shows in the big cities the attendance at the theater falls off at least 50 per cent. The motor show has pushed the horse show into a second position from a society standpoint and this is amply demonstrated by the reduction in demand and prices for horse show boxes during the past 2 or 3 years at the exhibition in New York. The motor car show stands next to grand opera, if it does not surpass it.

Shows of the past year or so have been the cause of changing



No Building In United States Large Enough to Care For All



many carriage dealers to motor car distributors. Carriage dealers all over the country have seen that they must get into the motor car industry as the sale of carriages and carriage equipment has decreased from 50 to 75 per cent.

Manufacturers who exhibit meet practically every dealer who goes to the show from the most distant points of the country. Dealers meet the buying public, make new acquaintances and secure the name and addresses of those who are really interested and intend to purchase. All this can be done in no other way at so small a cost. Many people, lured to the show by the superb decorations, good music and exhibits of highly polished chassis and luxurious new models, catch the enthusiasm while there and either purchase a car or go away with a resolution made that they will purchase in the near future. The glaring and dazzling features of a well decorated show always appeal to the younger members of the family. While they are not buyers today the enthusiasm created while at the show makes many of them future purchasers.

During November, 1900, the Automobile Club of America launched the first exhibition in Madison Square garden with sixty-nine exhibitors. On December 2, 1901, the second show opened with ninety-two exhibitors. There was no show in 1902, but each year since has seen successful exhibitions with the following schedule:

1903—January 17-24, Madison Square garden—198 exhibitors.

1904—January 16-23, Madison Square garden—205 exhibitors.

1905—January 14-21, Madison Square garden—247 exhibitors.

1906—January 13-20, Sixty-ninth Regiment armory—218 exhibitors.

1906—December 1-8, Grand Central palace—216 exhibitors.

1907—October 24-31, Grand Central palace—257 exhibitors.

1908-09—December 31-January 7, Grand Central palace—301 exhibitors.

1909-10—December 31-January 7, Grand Central palace—325 exhibitors.

Not only has the number of exhibitors increased from sixty-nine to 325 but the attendance has been tremendous, which means that shows are a necessity and a great business-getting proposition for the exhibitors.



EXHIBITORS

Pennsylvania Auto Motor Car Co.
..... Bryn Mawr, Pa.
Pierce Motor Co. Racine, Wis.
Premier Motor Mfg. Co. Indianapolis, Ind.
Randolph Motor Car Co. Chicago
Rapid Motor Vehicle Co. Pontiac, Mich.
Regal Motor Car Co. Detroit, Mich.
Reliance Motor Truck Co. Owosso, Mich.
Renault Freres Selling Branch. New York
Reo Motor Car Co. Lansing, Mich.
Saurer Motor Trucks. New York
Schacht Mfg. Co. Cincinnati, O.
Seitz Automobile and Transmission
Co. Detroit, Mich.
Simplex Motor Car Co. Mishawaka, Ind.
Speedwell Motor Car Co. Dayton, O.
St. Louis Car Co. St. Louis, Mo.
Staver Carriage Co. Chicago
Grant Square Automobile Co.
..... Brooklyn, N. Y.
Sultan Motor Car Co. New York
York Motor Car Co. York, Pa.

Motor and Accessory Manufacturers

Ajax-Grieb Rubber Co. New York
American Ball Bearing Co. Cleveland, O.
American Electrical Novelty and Mfg.
Co. New York
Atwater Kent Mfg. Works. Philadelphia
Atwood Castle Co. Amesbury, Mass.
Auto Improvement Co. New York
Badger Brass Mfg. Co. Kenosha, Wis.
Baldwin Chain and Mfg. Co.
..... Worcester, Mass.
Batavia Rubber Co. Batavia, N. Y.
Bowser & Co., S. F. Fort Wayne, Ind.
Breeze Carburetor Co. Newark, N. J.
Briscoe Mfg. Co. Detroit, Mich.
Brown-Lipe Gear Co. Syracuse, N. Y.
Byrne-Kingston & Co. Kokomo, Ind.
Chase & Co., L. C. Boston, Mass.
Coes Wrench Co. Worcester, Mass.
Columbia Nut and Bolt Co.
..... Bridgeport, Conn.
Consolidated Rubber Tire Co. New York
Continental Caoutchouc Co. New York
Cook's Sons, Adam. New York
Cramp & Son, William. Philadelphia
Dayton Rubber Co. Dayton, O.
Diamond Chain and Mfg. Co.
..... Indianapolis, Ind.
Diamond Rubber Co. Akron, O.
Deitz & Co., R. E. New York
Dixon Crucible Co., Joseph.
..... Jersey City, N. J.
Edmunds & Jones Mfg. Co. Detroit, Mich.
Electric Storage Battery Co. Philadelphia
Empire Tire Co. Trenton, N. J.
Excelsior Motor and Mfg. Co. Chicago
Firestone Tire and Rubber Co. Akron, O.
Fisk Rubber Co. Chicopee Falls, Mass.
Fox Metallic Tire Belt Co.
..... Brooklyn, N. Y.
G & J Tire Co. Indianapolis, Ind.
Gabriel Horn Mfg. Co. Cleveland, O.
Gemmer Mfg. Co. Detroit, Mich.
Gilbert Mfg. Co. New Haven, Conn.
Goodrich Co., B. F. Akron, O.
Goodyear Tire and Rubber Co. Akron, O.
Gray & Davis. Amesbury, Mass.
Hall Lamp Co., C. M. Detroit, Mich.
Hartford Rubber Works Co.
..... Hartford, Conn.
Hartford Suspension Co.
..... Jersey City, N. J.

EXHIBITORS

Hayes Mfg. Co. Detroit, Mich.
 Heinze Electric Co. Lowell, Mass.
 Herz & Co. New York
 Hess-Bright Co. Philadelphia
 Hoffer Co. Boston
 Janney-Steinmetz & Co. Philadelphia
 Kokomo Electric Co. Kokomo, Ind.
 Leather Tire Goods Co.

..... Niagara Falls, N. Y.
 Lebanon Steel Casting Co. Lebanon, Pa.
 Light Mfg. and Foundry Co.

..... Pottstown, Pa.
 Lovell-McConnell Mfg. Co. Newark, N. J.
 McCord Mfg. Co. Detroit, Mich.
 Manhattan Screw and Stamping

Works. New York
 Michelin Tire Co. Milltown, N. J.
 Morgan & Wright. Detroit, Mich.
 Mosler Co., A. R. New York
 Molsinger Device Mfg. Co.

..... Pendleton, Ind.

Muncie Gear Works. Muncie, Ind.

National Carbon Co. Cleveland, O.

Oliver Mfg. Co. Chicago

Pantasote Co. New York

Pennsylvania Rubber Co. Jeannette, Pa.

Pittsfield Spark Coil Co. Dalton, Mass.

Randall-Faichney Co. Boston, Mass.

Remy Electric Co. Anderson, Ind.

Republic Rubber Co. Youngstown, O.

Royal Equipment Co. Bridgeport, Conn.

Sager & Co., J. H. Rochester, N. Y.

Shaler & Co., C. A. Waupum, Wis.

Smith Co., A. O. Milwaukee, Wis.

Spicer Universal Joint Mfg. Co.

..... Plainfield, N. Y.

Splitdorf, C. F. New York

Sprague Umbrella Co. Norwalk, O.

Standard Roller Bearing Co. Philadelphia

Standard Welding Co. Cleveland, O.

Stewart & Clark Mfg. Co. Chicago

Stromberg Motor Device Co. Chicago

Swinehart Clincher Tire and Rubber

Co. Akron, O.

Timken-Detroit Axle Co. Detroit, Mich.

Timken Roller Bearing Co. Canton, O.

United Manufacturers. New York

United States Light and Heating Co.

..... New York

Valentine & Co. New York

Veeder Mfg. Co. Hartford, Conn.

Vesta Accumulator Co. Chicago

Warner Gear Co. Muncie, Ind.

Warner Mfg. Co. Toledo, O.

Warner Instrument Co. Beloit, Wis.

Westchester Appliance Co. New York

Wheeler & Schebler. Indianapolis, Ind.

Whitney Mfg. Co. Hartford, Conn.

Witherbee Igniter Co. Springfield, Mass.

Unattached Accessory Exhibitors

Allen Auto Specialty Co. New York
 Alexander, H. T. New York
 American Stepney Spare Wheel Co.

..... New York

Auburn Mica Co. Auburn, N. Y.

Automobile Supply Co. New York

Bosch Magneto Co. New York

Bretz Co., J. S. New York

Brown Co. Syracuse, N. Y.

Brownell, F. A. Rochester, N. Y.

Burrough Rims. New York

Calman Asbestos and Rubber Works

..... New York

Clover Mfg. Co. New York

Compact Co. New York

Connecticut Oil Co. Waterbury, Conn.

Cotta Transmission Co. Rockford, Ill.

Cross, Frank H. New York

Cryder & Co. New York

Doolittle Rim Co. New York

Dover Stamping and Mfg. Co.

..... Cambridge, Mass.

Driggs-Seabury Ordinance Corpora-

tion. Sharon, Pa.

Duffy Grease Co. New York

Manufacture of Motor Cars Now One of National Industries



By Alfred Reeves, General Manager, A. M. C. M. A.

MOTOR car making now is a national industry and on a par with any other line of manufacturing in America. This is best evidenced by the show which opens at Grand Central palace, New York, New Year's eve, when 325 exhibitors show products from every nook and corner of the United States. That the industry is national is proved, too, by the statistics showing the millions of dollars of capital involved, the thousands of cars made and sold and the thousands of employees of motor car and motor car parts factories.

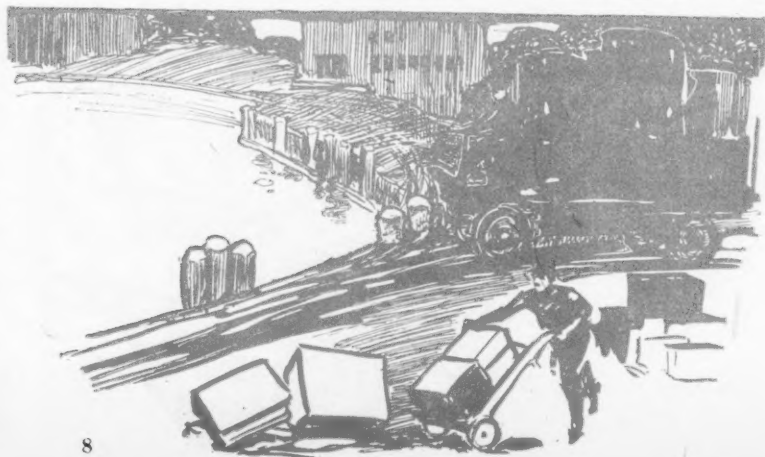
Figures that are conservative in every way made it appear certain that 200,000 motor cars are scheduled for 1910. They will be made in twenty-one different states by 263 makers located as follows:

Michigan	49	Wisconsin	5
Illinois	39	New Jersey	4
Indiana	30	California	4
Ohio	30	Rhode Island	3
New York	23	Nebraska	2
Pennsylvania	18	Maryland	2
Massachusetts	14	Colorado	1
Missouri	12	Nevada	1
Connecticut	10	Texas	1
Iowa	7	Kansas	1
Minnesota	6		

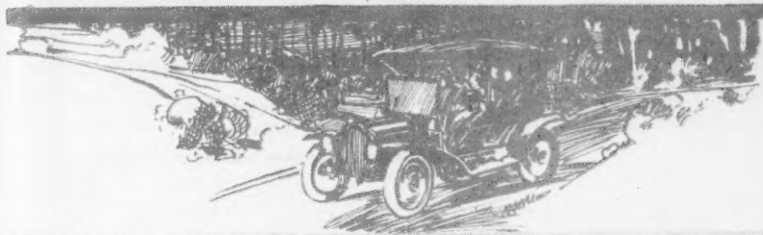
Of this number it may be said that 100 are legitimate makers turning out cars that are factors in the market. Seventy-five other produce fewer than seventy-five cars each, and are little heard of, while the remainder may be considered beginners whose products may not get beyond the experimental state. New York, for example, although credited in the above official list with twenty-three makers, has not more than seven substantial motor car factories.

Taking eighty of these leading makers and compiling their estimates for 1910, coupled with the reports from the parts makers and the inspection made while visiting sixty-two prominent factories last spring, shows that the 200,000 cars for next year will be divided primarily among five states.

Michigan is king, for in 1910 it will produce not fewer than



Production of 200,000 Cars In 1910 Predicted By Reeves



102,000 motor cars. Illinois will turn out 15,300; Indiana, 21,025; Ohio, 22,750; Wisconsin, 11,000; New York, 10,400; Massachusetts, 4,100; Pennsylvania, 3,250; Connecticut, 2,100.

When it is taken into consideration that the capital involved is between \$150,000,000 and \$175,000,000, that there are 5,200 agents for motor cars throughout the country maintaining garages and salesrooms, the whole employing more than 200,000 employes, no one can deny that the making of motor cars is now one of America's most important industries.

With the rapid growth of the industry there has been a general improvement in the good roads system throughout the country, and a general increase in business among hotels and roadhouses, and a general increase of trade among the hundreds of concerns that supply parts, materials and accessories for the motor car and its followers.

All sizes and types of motor vehicles, ranging from the cheap high-wheeled buggyabout up to the heaviest truck or the most luxurious limousine car, will be exhibited at the show at prices to suit all pocketbooks. There are no fewer than 325 individual exhibitors, including eighty-four different and distinct makes of cars. This wonderful display of complete machines includes the product of a dozen of the leading European factories which will be shown by the members of the Importers' Automobile Salon, while the other exhibitors of cars include the best examples and latest ideas in motor car construction from seventy-two of the leading American makers. In this connection it might be stated that nineteen of the American makers will also show a full line of commercial vehicles ranging from a little delivery car costing \$500 up.

According to statisticians who have figured the matter out 72,000 feet of floor space will be utilized in this year's show, but at that nearly double the space would have been sold if the room had been available. The total value of exhibits is over \$1,000,000. To decorate the building \$30,000 has been spent, turning it into a huge and beautiful trellis garden.

According to Charles E. Duryea, the technical expert of the association, the general tendency, except possibly in town cars, seems to be toward longer wheelbases, lighter and shorter motors, wider doors and enclosed front seats.



EXHIBITORS

Dayton Engineering Laboratory Co. Dayton, O.
Eastern Carbon Works. Jersey City, N. J.
Elite Mfg. Co. Ashland, O.
Flentje, Ernst Cambridge, Mass.
Fried Ostermann Co. Rockford, Ill.
Frasse & Co., P. A. New York
Garage Equipment Co. Milwaukee, Wis.
Gibney & Brother, J. L. Philadelphia
Grossman Co., Emil. New York
Gasoline Motor Efficiency Co.
..... Jersey City, N. J.
Geisler Storage Batteries. New York
Havoline Oil Co. New York
Haws, G. A. New York
High Frequency Coil Co.
..... Los Angeles, Cal.
Hill Mfg. Co. Buffalo, N. Y.
Hilton Mfg. Co. Boston, Mass.
Howard Demountable Rim Co.
..... Trenton, N. J.
Hydraulic Oil Storage Co. New York
International Engineering Co. New York
Ideal Wind Shield Co. New York
Johns-Manville Co. New York
Johnson & Co., J. G.
..... Spuyten Duyvil, N. Y.
Keystone Lubricating Co. Philadelphia
Kilgore Mfg. Co. Boston, Mass.
Lavalette & Co. New York
Lutz Lockwood Mfg. Co. New York
Light, Oliver Providence, R. I.
Merchant & Evans. Philadelphia
Metal Stamping Co. New York
Miller, Charles E. New York
Morrison-Ricker Co. Grinnell, Ia.
Miller Sons, W. P. Long Island City, N. Y.
Moller & Schumann Co. Brooklyn, N. Y.
Meyers, A. J. New York
Newark Rivet Works. Newark, N. J.
N. J. Car and Spring Co.
..... Jersey City, N. J.
New York Coil Co. New York
Newmastic Tire Co. New York
Nightingale Whistle Mfg. Co. New York
Nonpareil Horn Mfg. Co. Brooklyn, N. Y.
Noonan Tool and Machine Co.
..... Rome, N. Y.
Osburn Electric Co. Detroit, Mich.
Perfection Spring Co. Cleveland, O.
Perfection Wrench Co.
..... Port Chester, N. Y.
Polson, W. F. Buffalo, N. Y.
Prosser & Son, Thomas. New York
Quincy-Manchester-Sargent Co.
..... Plainfield, N. J.
R. I. V. Co. New York
Raines & Co. New York
Rothstein Mfg. Co. New York
Rushmore Dynamo Co. Plainfield, N. J.
Rutherford Rubber Co. Rutherford, N. J.
Salman, John A. Boston, Mass.
Shipman Instrument Co. Sunbury, Pa.
Sireno Co. New York
Siro Carburetor Co. Springfield, Mass.
Smith, Fred W. Aberdeen, S. D.
Standard Leather Washer Co.
..... Newark, N. J.
Standard Metalwork Co.
..... Thompsonville, Conn.
Stanley & Patterson. New York
Stevens Co. New York
Supplementary Spiral Spring Co.
..... New York
Tracy, Joseph New York
Traver Mfg. Co., P. C.
..... Far Rockaway, L. I.
Troy Carriage Sun Shade Co. Troy, O.
Tuttle Co., D. M. Canastota, N. Y.
Union Battery Co. Bellville, N. Y.
Vanadium Metals Co. Pittsburg, Pa.
Vehicle Apron & Hood Co. Columbus, O.
Victor Auto Supply Mfg. Co. New York
Victor Tire Traction Co. Boston, Mass.
Wilson Trading Co. Cortlandt, N. Y.
Wayne Oil Tank and Pump Co.
..... Fort Wayne, Ind.
Westinghouse Companies. Boonton, N. J.
Wilson Trading Co. New York
York Auto Wheel Co. York, Pa.
Zeglen Tire Co. Chicago

MOTOR AGE

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The Show Circuit Opens

THIS week witnesses the formal opening of the annual show circuit in the Grand Central palace, and it is questionable if any previous opening will compare with the present one in not a few respects. To begin with the American Motor Car Manufacturers' Association is in a different condition from what it was a year ago. At the present time several of the leading exhibitors at the palace are recent additions to the ranks of the Association of Licensed Automobile Manufacturers, so that for the first time there is somewhat of a mixture, concerns exhibiting which at the present time are members of both associations. This has all been brought about by the recent court decision sustaining the status of the Selden patent, as well as the landslide of more than half a dozen of the leading makers of the independents to the licensed fold during the past few months.

W HATEVER may or may not be the mental conditions of many of the exhibitors the fact remains that some of the best productions of the medium-priced cars will be shown to the public in their 1910 dress, and the pros and cons on them will be as usual quickly noted by the selling and demonstrating forces of the many makers showing. On other pages of this issue many of the prominent phases of the motor car for next season are dealt with and it would be useless here to more than refer to the great trends of the times if the progress is sufficiently uniform that such can be segregated and classified. The problems that have interested many of the designers during the last 10 months are not in scores of cases conspicuous on the surface; in fact, with many cars a careful scrutiny of the stripped chassis will fail to reveal any of the real changes made, yet changes have been made which will have a most salutary effect on the running and maintenance of the cars for next season. This fact that improvements can be made on cars and yet these improvements not appear on the surface is another proof of the fact that the motor car is a creation constructed according to the laws and based on the principles of science.

THIS fact alone should inculcate in the minds of many owners as well as many buyers the fact that a careful knowledge of the car is essential, and it remains a fact that if the American buyer were a more intelligent one some of the manufacturers would have to junk more of the parts than they do at present. A critical and judicious buying clientele is an excellent stimulus to any industry.

THE car for next season is a more conventional production in the majority of cases than the machine of this year. A couple of seasons ago several manufacturers prided themselves on the fact that their cars were not as others were; and that their machines possessed constructions that the other makers would be imitating before a couple of seasons would elapse. Well, those two seasons have elapsed in several instances and it is the maker with the pet creation who has, in nine cases out of ten, dropped out of the running and is this year lined up in convention row, having adopted features of design that he spurned a couple of years ago. This trend towards the conventional is good, provided the conventional design is correctly worked out and founded on correct scientific principles. However, there must be some deviations from the conventional else progress would be unpardonably slow. Deviating from the convention has proven particularly expensive during the last three seasons to many makers and with the present demand there is little necessity to explore the ramifications of engineering research in the hope of achieving something that will require years to perfect.

THIS present trend of the maker towards the conventional is characteristic of the American race. It is a dollar-and-cent proposition. It is easier today to sell a conventional car than one that contains several features not found on other cars, and with which feature the greater portion of the buying public is not familiar. There is more money today in the conventional car than in the unconventional one. The best criterion of the progress, or at least change, if in some case it may appear risky to designate several of the changes as improvements, is found in the middle or cheap-car class, because it is in this department that the big strides in manufacture are being made; and it is a question if the processes of manufacture are not receiving more attention today than are the problems of sound engineering practices. It is of more concern today to many makers to get parts than to solve questions of design; it is of more concern to some to get machinery to manufacture certain parts than it is to get engineers to design such parts; and it is vitally of more concern to many to feel assured of being able to buy certain manufactured parts than it is to know the treatment best suited for the steel in these steels. The very fact that reputable makers are buying stock parts is prima facie proof of their confidence in such parts, and so conventionality is aided by this procedure on their part.

STUDEBAKER INJUNCTION PLEA WITHDRAWN

DETROIT, MICH., Dec. 29—Judge Swan in the United States district court this morning refused the request of the Studebaker Automobile Co. to dismiss without prejudice its application for an injunction against the E-M-F company to prevent the latter from marketing its own output. The Studebaker desired the injunction proceedings stopped in order to start a suit for \$10,000,000 damages.

Later, after prolonged argument and an agreement between the attorneys, Judge Swan modified his decision and dismissed the application for the injunction, stipulating, however, that the Studebaker Automobile Co. change the form of the litigation to a suit for damages, to be filed within 10 days, all the affidavits and other evidence filed in the first suit to be admitted as evidence in the second, both parties to refrain from using the litigation as a basis for advertising, the Studebakers to confine all litigation with the E-M-F company to the one court and to refrain from harassing dealers or other corporations with any litigation on the subject whatever.

Decision of Kalamazoo Court

Detroit, Mich., Dec. 24—Relieved of the necessity for manufacturing cars, the sale of which had been enjoined temporarily by the United States circuit court, the Everitt-Metzger-Flanders Co. has been making strenuous efforts to secure shipping facilities for the completed cars which had been piling up during the firm's difficulty with the Studebaker Automobile Co., of South Bend. The dissolving of the injunction on Thursday at Kalamazoo found the E-M-F with conditional orders for over 5,000 cars, retailers from all parts of the country having been quick to take advantage of the firm's announcement of a rupture of relations with the Studebakers, who had been, for several months, the sole distributors of E-M-F cars to the trade. All the orders had been accompanied by deposits and were made and accepted on condition that the E-M-F came out victorious in its battle in the courts.

At the time Judge Severens dissolved the injunction, the E-M-F had nearly 1,000 cars stored in warehouses in various parts of the city, the greatest number being at the Clark avenue plant, where temporary shelter had been constructed to supplement the floor space of the factory. The shipping department immediately started on a crusade for box cars and trainload after trainload of E-M-F cars left Detroit Saturday, Sunday and Monday, prospects indicating that the railroads would be able to take care of the remainder of the surplus in the rest of the days of the present week.

The proceedings at Kalamazoo in which the E-M-F won a decisive victory were followed by request for the dismissal "without prejudice" of the injunction proceedings in the United States district court in Detroit on Monday. This action was asked by the attorneys for the Studebakers and in face of a strenuous protest by the E-M-F legal talent which wanted Judge Swan to sift the matter to the bottom and render a decision on the merits of the argument and the evidence. The fact that he may not do so leaves a loophole which, it was stated by the Studebaker attorneys, would probably be taken advantage of for the filing of a suit for \$10,000,000 damages against the E-M-F company.

Compromise Rumors Denied

In the meantime, rumors of compromise have filled the air, met, however, by invariable denials at the headquarters of both of the rival organizations. The proceedings at Kalamazoo brought together the rival interests solely in the relation of stockholders of the same company. The Studebakers, in the persons of Messrs. Eames, Studebaker and Fish, as minority stockholders, petitioned the court to invalidate the action of President Flanders, of the E-M-F, in annulling the sales contract between the companies. The chief claim was based on the alleged fact that Mr. Flanders' action had not been rati-

fied by a majority of the directors at a regular meeting of the company's board. The E-M-F produced affidavits showing that such an action had been taken by a majority of the board and pleaded that any order rescinding it would cripple, if not completely annihilate the company. Judge Seaverns' ruling dismissed the injunction proceedings, leaving the E-M-F free to market its own product. In his decision the judge plainly stated his reluctance to pass on any phase of the case involving the rights of the Studebaker Automobile Co., which was not even represented at the hearing. This question, he admitted, should be settled in a suit between the two companies. The gist of his decision was summarized, however, in the following paragraph:

"But I do not propose to determine this motion, upon the grounds that the necessary parties are not here present. For, in my opinion, the proposed action of the board of directors is justified by the stipulations of their contract and the alleged violation of them by the Studebaker company. It is a question of business, addressed to the board of directors and not one in which the court has province, unless in very special circumstances, such as, when the board, disregarding its duty to exercise its honest judgment in the affairs of the company, turns aside to a scheme which is fraudulent and injurious to it. In the present case no such condition is shown. There is at all times a presumption of good faith and this presumption is reinforced by the presumption that a man would not wilfully pursue a course harmful to himself, and these directors own a large part of the stock of their corporation. I do not think that it can fairly be said that the presumptions are overcome and must, therefore, hold that the allegation of prejudicial conduct on the part of the board of directors is not sustained; but therefore no sufficient grounds for the interposition of a court of equity is shown and that the motion for an injunction should be overruled."

Decision Rendered Thursday

This decision was handed down on Thursday. On Friday the E-M-F directors filed in the district court in Detroit a large stack of affidavits, as part of their answer to the suit brought in that court in which the legality of the action annulling the contract was in question, the Studebaker Automobile Co. appearing in the suit. The most striking one of these affidavits was that of President Walter E. Flanders in which he told of a conference with Frederick S. Fish, one of the officers of the Studebaker company who also is a stockholder in the E-M-F. Flanders says that Fish urged him to unite issues with the Studebakers in the formation of a new motor car corporation, to be capitalized at \$80,000,000, the E-M-F to be turned in for from \$5,000,000 to \$7,000,000. Flanders says that he was cautioned not to mention the plan to any of the other members of the E-M-F. He refused to lend his aid to the plan and stated flatly that he would retail the entire proceeding to his directors, which he did shortly after. E. Leroy Pelletier, advertising manager of the E-M-F, who later signed a contract with the Studebakers to exploit the allied products, recounts a conversation with Hayden Eames, another of the Studebaker coterie, also interested in the E-M-F, in which he says that Eames told him that no further dividends would ever be declared on E-M-F stock, a statement which greatly interested Pelletier, owing to the fact that he was the possessor of 2,500 shares of stock in the corporation. Pelletier says that he pressed Eames for details, but was put off with the assurance that he would be taken care of.

Many Affidavits are Filed

Affidavits by other members of the E-M-F company, as well as several other companies who have large contracts for parts with the E-M-F, were included in the batch. All these stated the great damage which would result, were a permanent injunction issued, preventing the E-M-F from marketing its product. One of these was from C. Arthur Benjamin, of Syracuse.

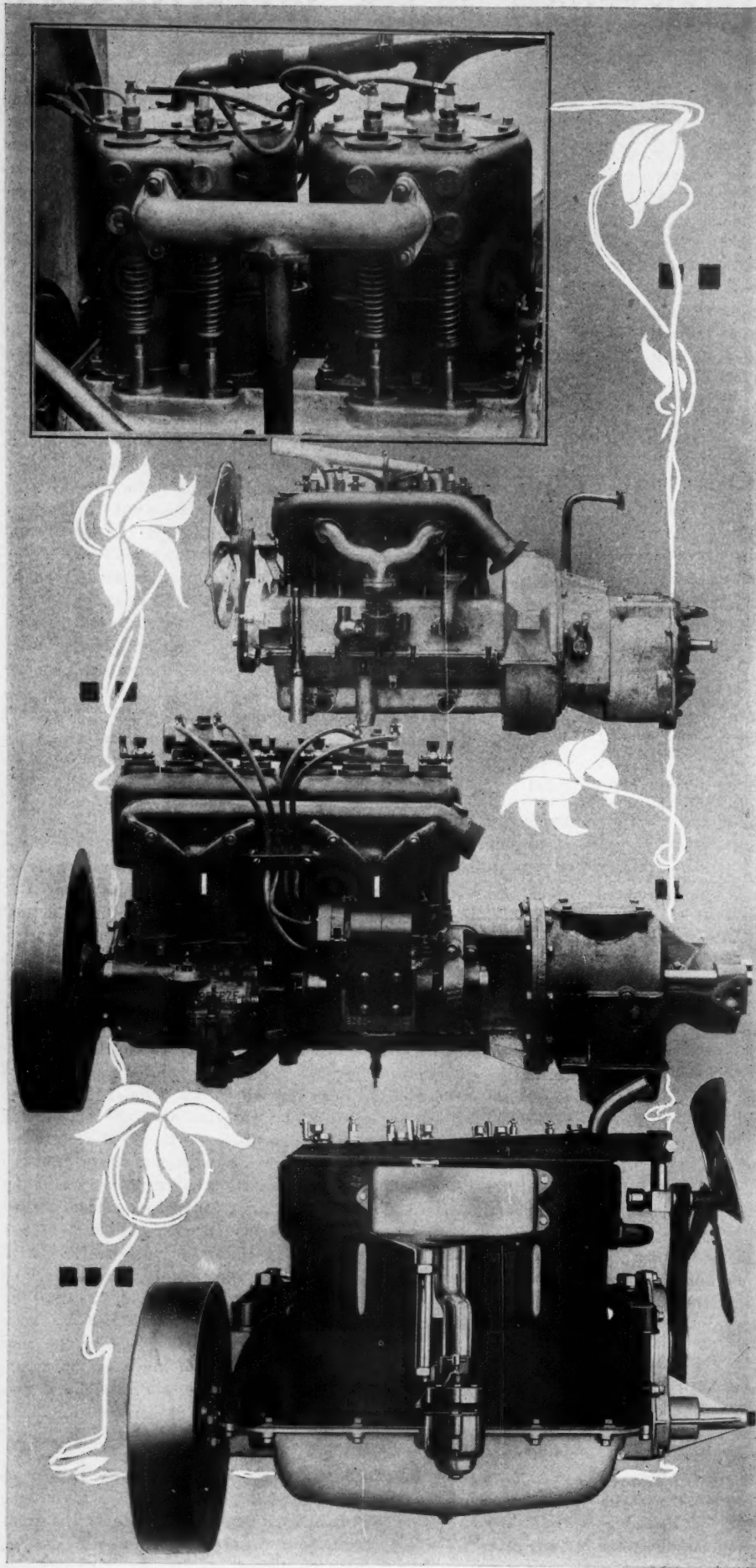
Some New

PEAKING roughly, there are four typical 1910 American cars. The first may be designated the \$1,000 car, although in this class are included cars selling from \$750 to \$1,200; the second is the \$1,500 car; the third the \$2,500 car; and the fourth the \$4,000, the last named representing a broad field and being indicative of the high-priced machine, whether it is secured for \$3,700 or \$7,500. The average motor in the \$1,000 class, as calculated accurately from all the exhibitors at the Grand Palace show, is 17.2 horsepower, A. L. A. M. rating. This average motor has a bore of 3.83 inches and a 4-inch stroke. Its piston displacement in cubic inches is 129.2. In this class of motors the L type of cylinder predominates, embracing as it does 61 per cent of this class. The T head cylinder takes second place with 23 per cent, and the valve-in-the-head type comes third with 15 per cent to its credit.

Structural Ramifications

The structural ramifications of the average \$1,000 motor, or the motor used in the \$1,000 car, may be carried further; 54 per cent of the motors of this class at the Grand Palace show has separately-cast cylinders; 23 per cent is cast in pairs, and 23 per cent is cast en bloc. It is worthy of note to recognize in passing the enormous strides that the en bloc motor is making. Three or 4 years ago, when this type of motor made its debut in Europe, American designers were quick to criticise it on the ground that it would not be suited for the low temperatures of America—because should the jacket water freeze it would mean an entire new casting. Since these criticisms were first lodged, circumstances have changed. Making cylinder castings has become an art, and it now is possible to produce a single casting incorporating within it four cylinders, as it was then to make a twin casting. The en bloc offers many advantages, chief among which is the simplification of intake, exhaust, and water pipes, the majority of which are now incorporated in the casting.

A stop must not be made here in analyzing this average motor of the \$1,000 car. To be precise 85 per cent of these motors are cooled on the thermo-syphon principle, and but 8 per cent have water circulation maintained by pump, and the remaining 8 per cent are air-cooled. One year ago Motor Age drew attention to the almost certain advance of the thermo-syphon. Today, these predictions have been more than accomplished. The thermo-syphon motor has fewer parts, is correspondingly simpler and simplicity is the ultimate goal of motor design.



INTAKE SIDE OF NEW MOON MOTOR FOR 1910
UNIT POWER PLANT IN THE NEW PATERSON MOTOR
THE HUPMOBILE IS A GOOD EXAMPLE OF UNIT DESIGN
THE NEW EVERITT MOTOR WITH ITS BIG EN BLOC CASTING

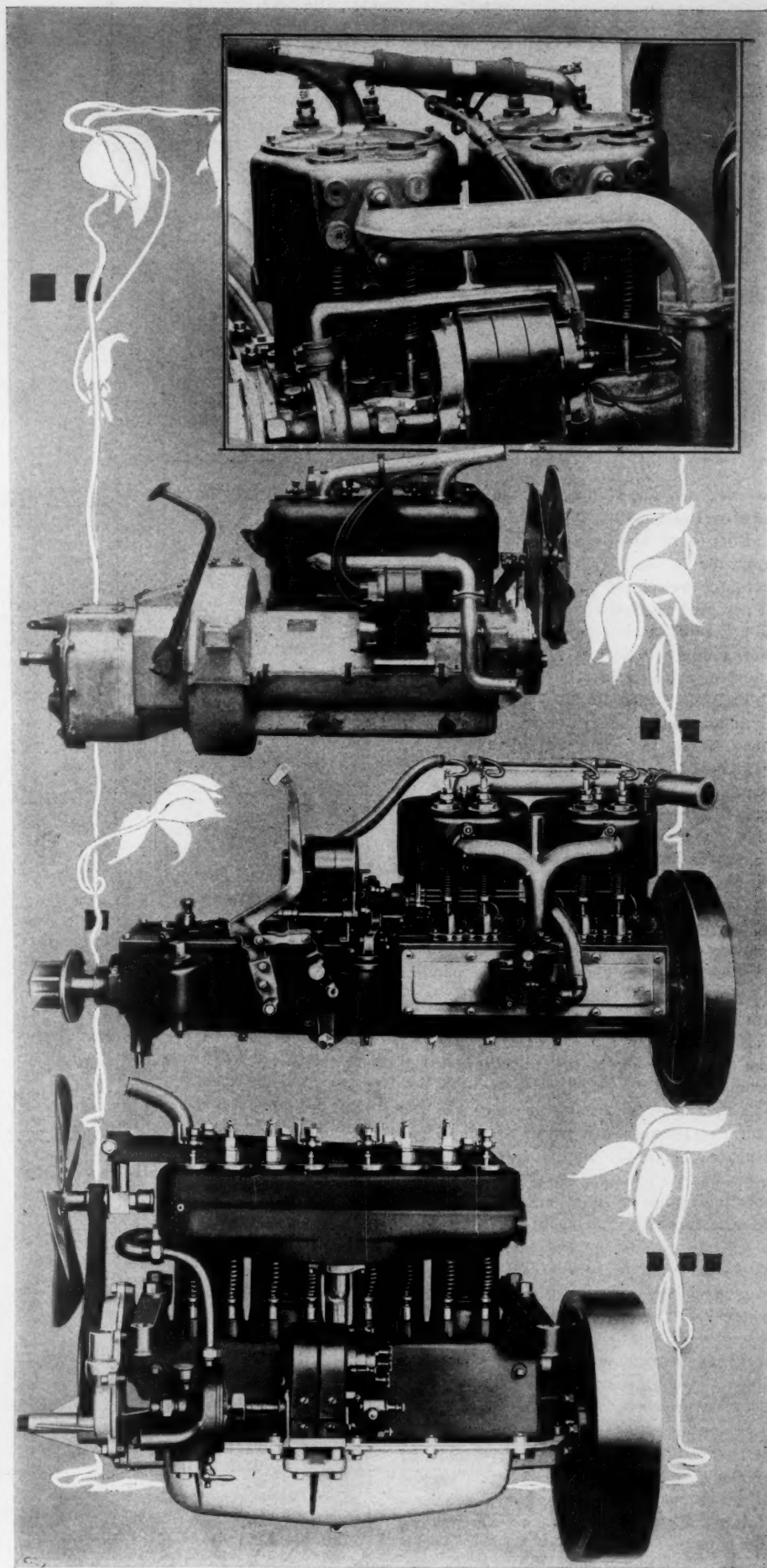
1919 Model

Looking at the \$1,000 motors at the ignition phase only, it is of interest to note that all are fitted with the high-tension system, there not being a single example of the make-and-break spark in use. The magneto practically is universal. Thirty-nine per cent of these little motors has single ignition systems; by this is meant one source of current supply; 30 per cent of them has dual magneto and battery systems, with a single set of plugs; and 30 per cent of them has double systems, possessing two sets of spark plugs, a complete magneto system, and a complete battery system.

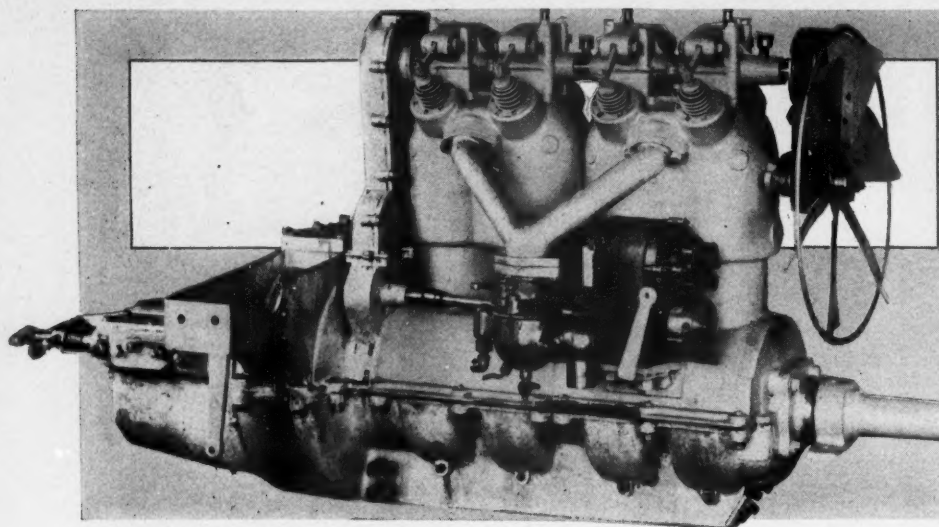
Two more aspects of this \$1,000 motor remain, and they must be treated briefly. One hundred per cent of them uses gravity feed for the gasoline to the carbureter. In the lubricating system the same which is true of the big cars is true of these smaller brothers, namely, that the circulating system is away in the majority, by circulating system being meant a basement oil reservoir in the crankcase with a gear or plunger pump to elevate the oil to the crankshaft bearings or cylinders, whence it drips into the crankcase proper to maintain a level for the splash. From this level it overflows into the basement, whence it is filtered and ready to be recirculated. To be accurate, 54 per cent of these little cars uses this system. Fifteen per cent continues using a mechanical oiler, this being the conventional type of lubricator with banks of pumps and driven by belt, ratchet, gear, or otherwise, from some of the motor parts. A lubricating system that is gaining ground in this class of car is that in which the oil reservoir is a housing which contains the flywheel, the flywheel being the pump, which lifts the oil by centrifugal force and deposits it in troughs cored to the sides of the crankcase and which troughs or grooves conduct it to the crankshaft bearings and to the two, four, or six compartments of the crankcase. Eight per cent of these cars continues using the compression oiler, this being a lubricator in which the oil is forced to the motor by crankcase or other compression.

Next Comes \$1,500 Class

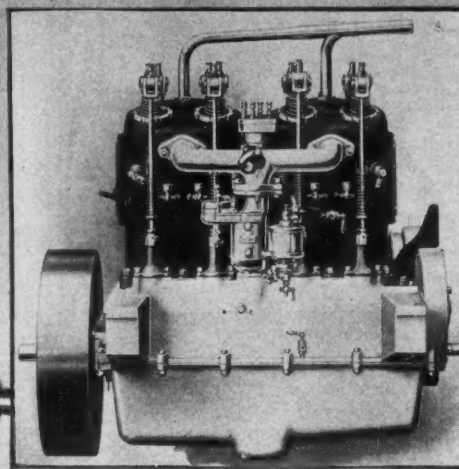
After dealing thus lengthily with the \$1,000 motor, a briefer consideration must be given to the average motor in the \$1,500 class. In short, this motor has a formula rating of 26.6 horsepower. Its average bore is 4.1 inches and its stroke 4.3 inches, its piston displacement in cubic inches measures 26.2. This motor is a better example of the long stroke than the \$1,000 one, in that the stroke is .27, or practically 1/4-inch longer than the bore;



EXHAUST SIDE OF NEW MOON MOTOR FOR 1910
NON-VALVE SIDE OF NEW PATERSON MOTOR
SINCE ITS INCEPTION MAXWELL USED UNIT DESIGN
THE VALVE, MAGNETO AND PUMP SIDE OF EVERITT



NEW SMALL-SIZED JACKSON MOTOR



THE STODDARD-DAYTON

whereas, in the \$1,000-class the stroke exceeded the bore by 1/6 inch.

But there are many other interesting features in the \$1,500 motor. Ninety per cent of them is of the four-cylinder type; 5 per cent is of the six-cylinder type, and 5 per cent of the two-cylinder. There is not a single example of the one-cylinder or three-cylinder in this class.

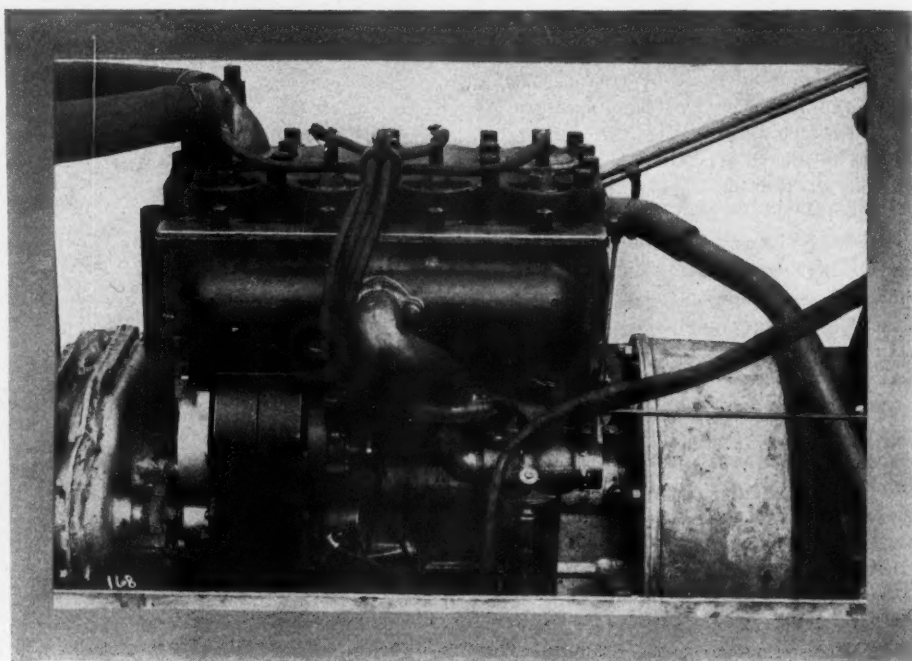
Viewed constructively, the L type of cylinder has the lion's share of followers here as in the smaller division, 75 per cent being of this design, with 20 per cent employing the T head, and 5 per cent the valve-in-the-head type. It is harder in this class to draw the lines of tendency in the mode of casting cylinders, in that 50 per cent uses separately-cast cylinders, 35 per cent casts them in pairs, and but 15 per cent uses the en bloc system. This proves conclusively that for the present at least the en bloc casting is popular with the cheap car, and gradually loses out in the scale of ascending prices.

But this class, also, has its surprises in the cooling of the motors, although not so pronouncedly as in the smaller division. It may appear surprising to many, yet the thermo-syphon carries the day with 45 per cent to its credit, closely followed, however, by 40 per cent employing the circulating pump system, and 15 per cent being followers of air-cooling.

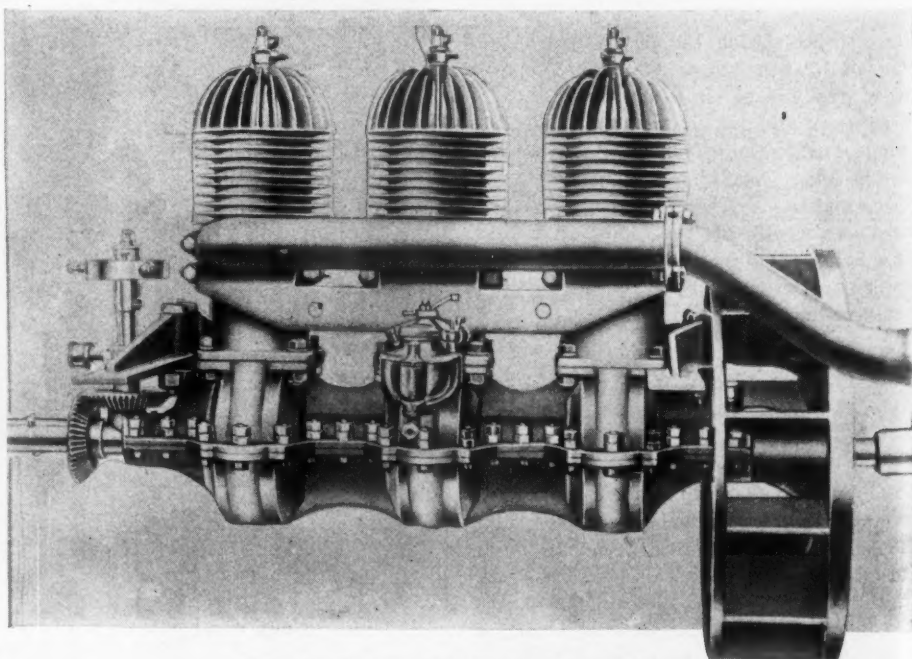
A brief resume of the ignition system shows them all to belong to the high-tension division, with the magneto everywhere and the dual system greatly in the ascendency. Sixty-five per cent, to be accurate, is using it, whereas 20 per cent employs the double system, and 15 per cent the single system.

In carburation one notes the first step in the trend towards using pressure feed on the gasoline as the price rises. Ninety-five per cent employs gravity. The remaining 5 per cent using pressure shows the entering wedge which attains considerable proportion—as high as 33 per cent in the \$4,000 class.

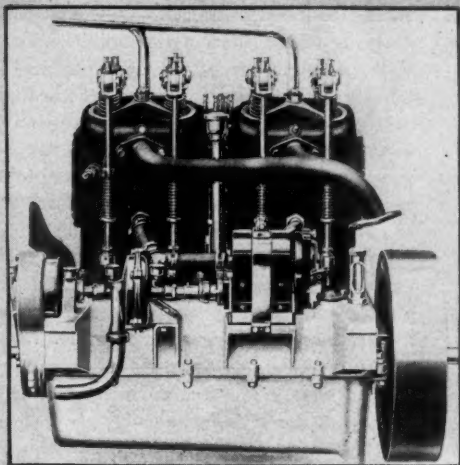
An analysis shows the circulating system to control 60 per cent of the motors



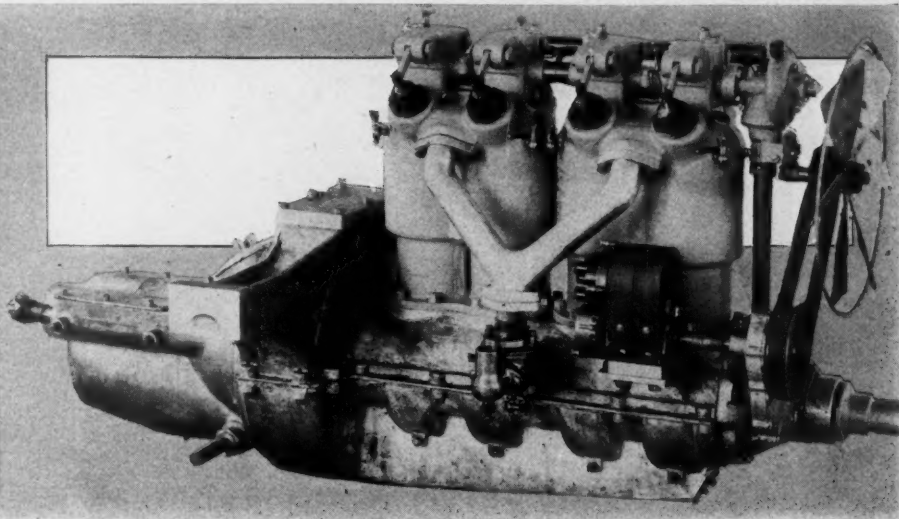
THE FOUR-CYLINDER MOTOR OF THE EMPIRE CAR



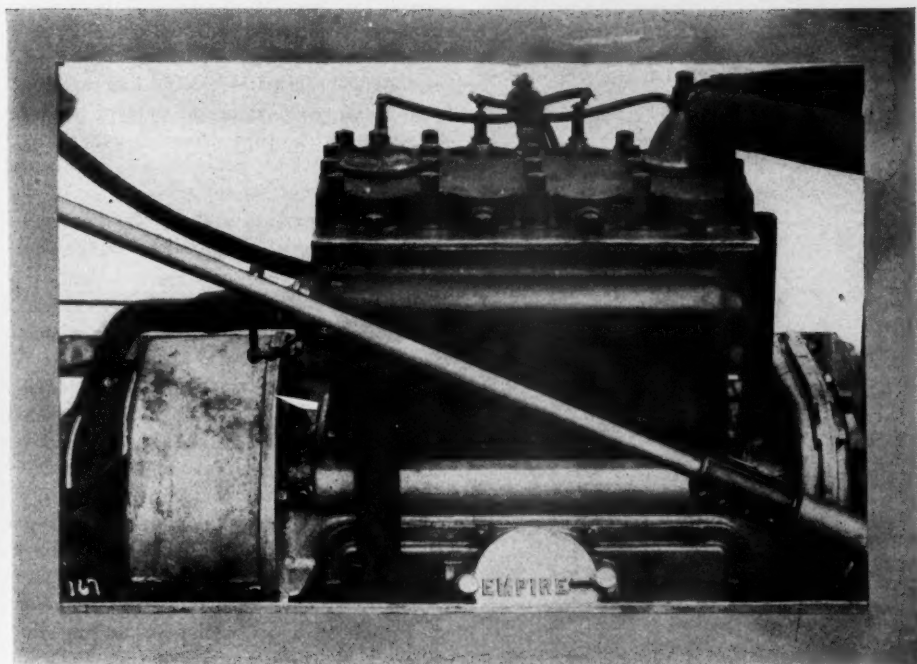
THE AIR-COOLED, TWO-CYCLE COATES-GOSHEN



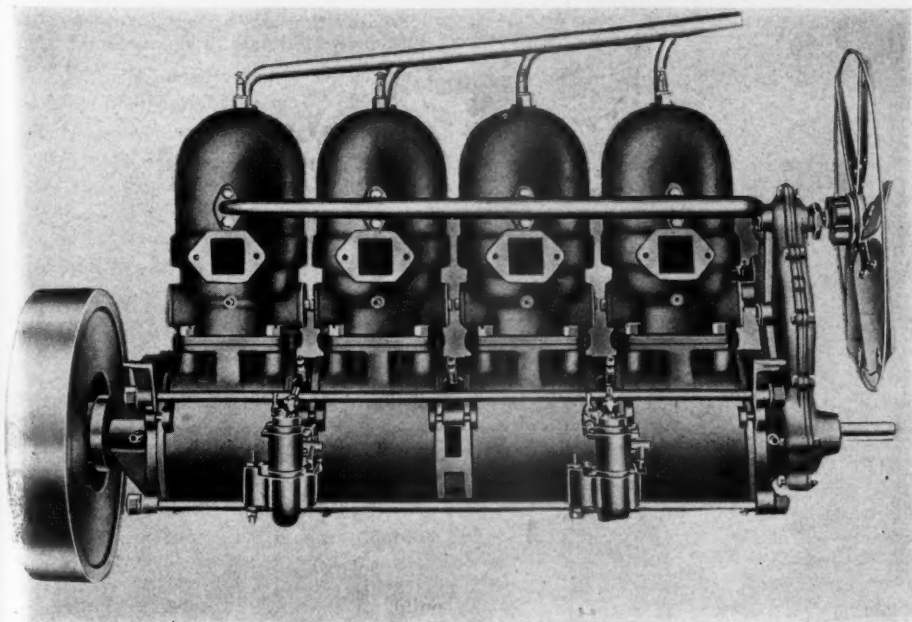
THE STODDARD-DAYTON



THE LARGER JACKSON MOTOR DESIGN



ONE SIDE OF THE NEW EMPIRE MOTOR



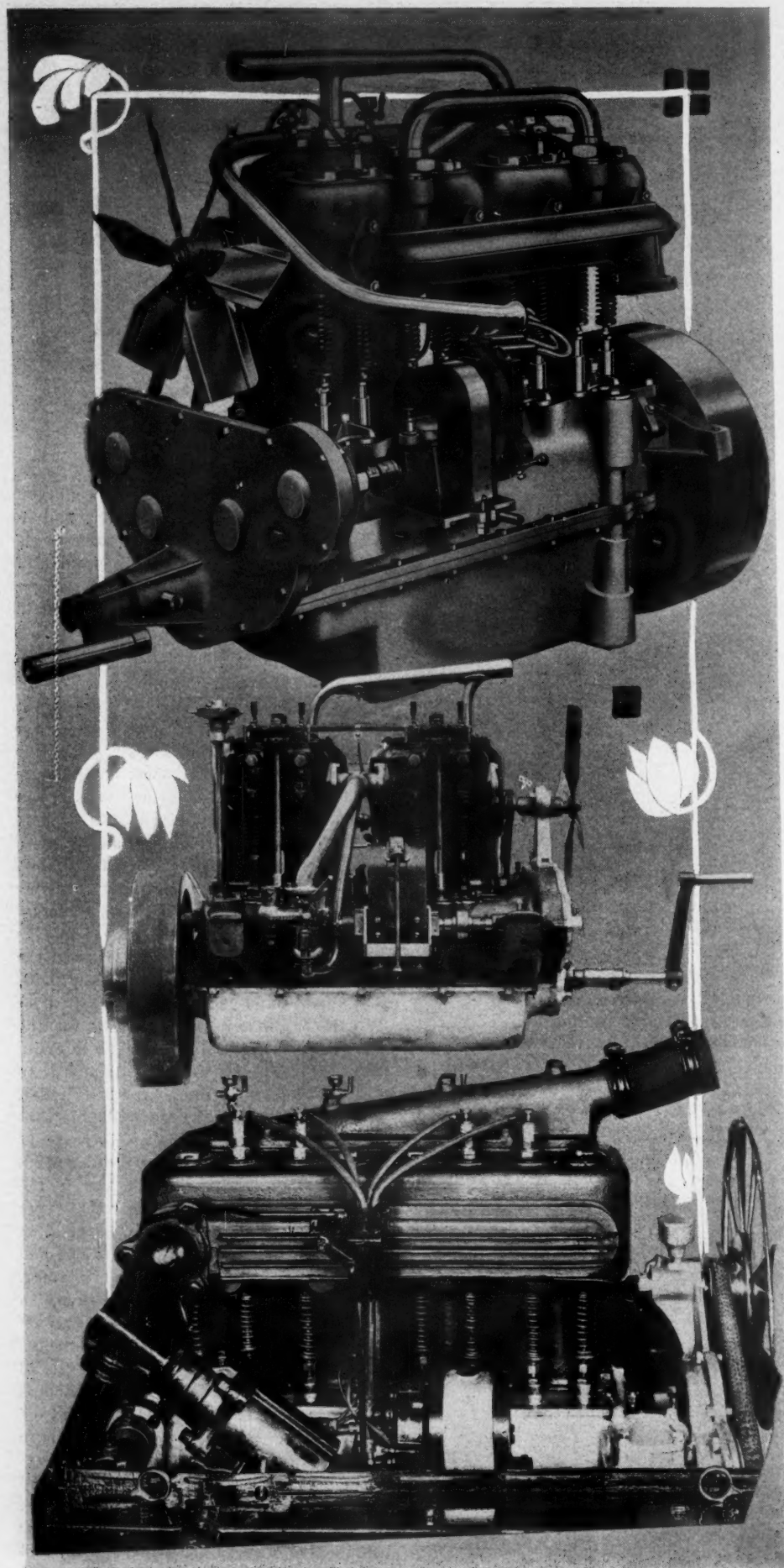
FOUR-CYLINDER, TWO-CYCLE ATLAS FOR 1910

of this category, with 10 per cent continuing with a mechanical oiler, and 10 per cent using the centrifugal force of the flywheel as the source of oil circulation. But 5 per cent in this class uses a compression oiler, and 15 per cent what is designated as a gravity system with a pump in combination.

The \$2,500 Class

The reader cannot help but note in the \$2,500 motor the transitions; this is the third step in the motor classification, and the percentage figures show gradual increase along certain lines of design. The \$2,500 motor has a rating of 32.7; its bore is 4.41 inches, its stroke 4.89, and it has a piston displacement of 314.5 cubic inches. Here one notes a little stronger tendency towards the long stroke, the stroke averaging $\frac{1}{8}$ -inch more than the bore. In this class there is a perceptible increase in the six-cylinder type, although the four holds the upper hand, constituting as it does 84 per cent, leaving 12 per cent for the six-cylinder and 4 per cent for three cylinders. Once more we are compelled to record a victory for the L type of cylinder, with 56 per cent, and exactly double that of the T-head. There is an increase in the valve-in-the-head type, which shows 8 per cent. A feature in this car is the two-cycle motor, which constitutes 4 per cent of the total. There is a reversal in this class as compared with the \$1,000 and \$1,500 motor in the casting of cylinders. We now have reached the stage in which the casting in pairs is far in the ascendancy, whereas up to this point the separately-cast cylinder led. Now, however, 76 per cent of the \$2,500 car has cylinders cast in pairs. Twenty-four per cent of them has the separate castings, and there is not a single example of the en bloc variety.

But we must push on in this analysis. For the first time thermo-syphon cooling has to give way to the water pump, and air-cooling has not a single follower. Eighty per cent of \$2,500 cars employs the circulating pump, and only 20 the thermo-syphon system. This four-to-one ratio in



NEW MOTOR USED IN THE 1910 FALCAR
 PREMIER REMAINS FIXED WITH LOW-TENSION IGNITION
 EN BLOC MOTOR USED IN NEW COURIER CARS

favor of the water pump stands out in strong contrast with the \$1,000 and \$1,500 cars, in which thermo-syphoning led.

A hasty review of the ignition problem brings out another reversal of the accepted order in the \$1,000 and \$1,500 classes. We now have reached the stage in car construction in this class where the double ignition system stands at the head with 48 per cent to its credit. It is closely followed, however, by the dual type, which has a following of 44 per cent. The single system is away to the rear with but 8 per cent to its credit, and, as in the \$1,000 and \$1,500 class, there is not a single example of the make-and-break type.

We pass next, in a sentence, to the progression of users favoring pressure feed on the gasoline, the 5 per cent of the \$1,500 class having grown to 8 per cent in this class, leaving 92 still devotees of direct gravity feed.

Lastly, for the \$2,500 car, in a cursory review of lubrication, it is interesting to note that the circulating system predominates more in this price of car than in any of the others, reaching the high-water mark of 56 per cent, leaving 28 per cent still following the mechanical-oiler system and 16 per cent employing the flywheel.

Four Thousand-Dollar Class

We have now reached the \$4,000 car, and its motor differs widely in many respects from the motor of the \$1,000, \$1,500 or \$2,500 class. In the \$4,000 car it is a four-cylinder versus six-cylinder fight, with 60 per cent of the followers pushing the four along and the amazingly high percentage of 40 per cent pinning its faith to the six. It is only after one carefully analyzes the different makers of sizes throughout the country that the number manufacturing sixes is comprehended. In order that no misunderstanding may arise it is well to state that of the total number of motors used this year in this class 40 per cent will not be six-cylinder ones, but the fact remains that 40 per cent of the builders in this category manufactures six-cylinder cars.

What is the average \$4,000 motor, or the motor in the \$4,000 car? It has 51 horsepower A. L. A. M.; it has a bore of 4.82 inches; it has a stroke of 5.15 inches; and it has a piston displacement of 448.2 cubic inches. Briefly, this motor is a disciple of the long stroke, the stroke being, roughly speaking, $\frac{1}{3}$ -inch longer than the bore. This is not quite up to the $\frac{2}{3}$ in the \$2,500 class.

We may now prepare ourselves for some of the contrasts in tendencies of construction in this motor as compared with that in the three previous classes. It is to be expected that in the high-priced car the question of cost of manufacture does not enter to the same extent as in the low-priced car. Makers of \$4,000 cars do not build in the quantities that the \$1,000, \$1,500 or the \$2,500 maker does. As a result this car has certain characteristics

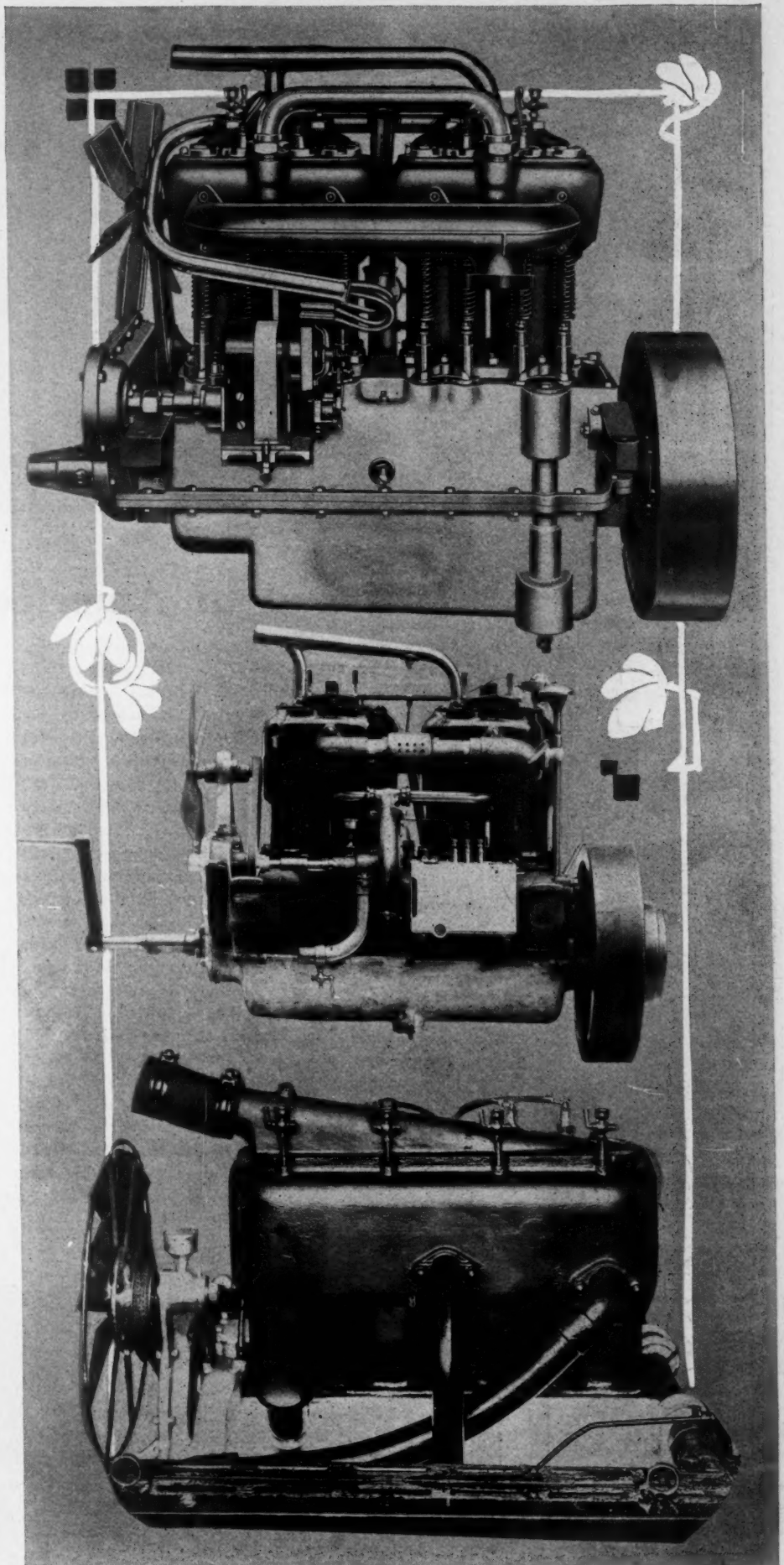
of the motor, first among which is the employment of the T-head type of cylinder, which predominates to the tune of 53 per cent. But 26 per cent uses the L-head type, and only 20 per cent the valve-in-the-head design. This is the first time in this review of 1910 motors that the T-head has predominated, the L-type of cylinder taking the lead in all three of the previously mentioned classes. Hand in hand with the victory of the T-head in this category is the four-to-one victory of casting cylinders in pairs, 80 per cent following this mode of manufacture and the remaining 20 per cent employing the single-cylinder scheme of casting.

To hastily conclude this analysis, the reader is next impressed with the diminution in thermo-syphon cooling, but 7 per cent using it, and the great majority of 93 using the circulating pump. The ignition phase offers close comparisons, 7 per cent employing the make-and-break spark, this being the only class in which the system has appeared. It is an equal fight between the followers of the double system and those favoring the dual, there being 47 per cent in each. Not one example of the single system appears.

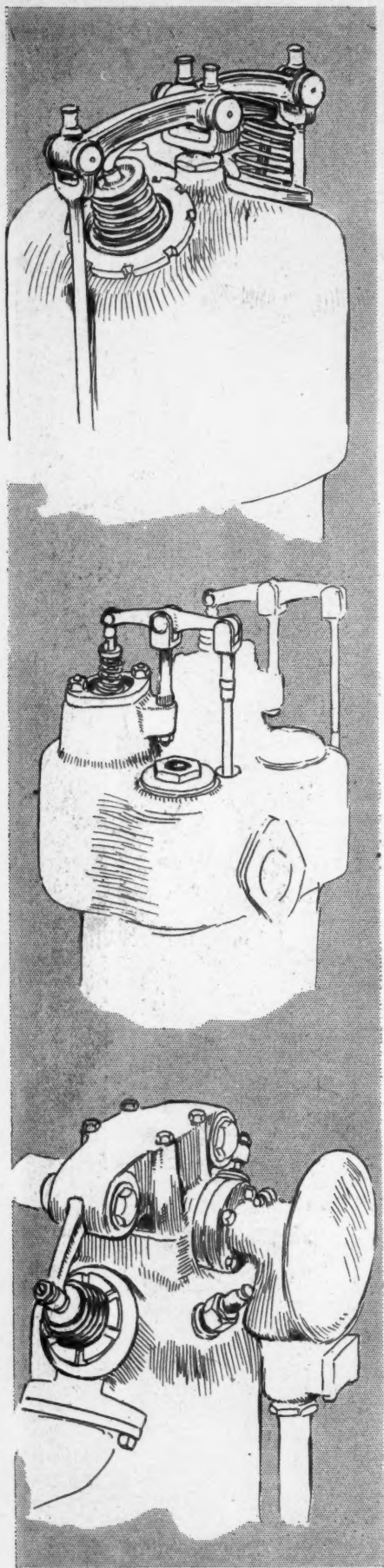
Passing to carburation, we are confronted with another startling surprise in that 33 per cent use pressure feed on the gasoline and 67 gravity. The high percentage of pressure feed is to a large extent due to that growing tendency of utilizing every possible bit of body space for carrying baggage, and so the gasoline tank under the front seat goes to the rear.

Lastly, we come to lubrication, and here, as before, we find a victory for the circulating system, with the mechanical oiler as its only competitor, the use of the fly-wheel, or the pressure system having entirely disappeared in this field. Fifty-three per cent uses the circulating system, closely followed by the 47 per cent which retains the mechanical oiler.

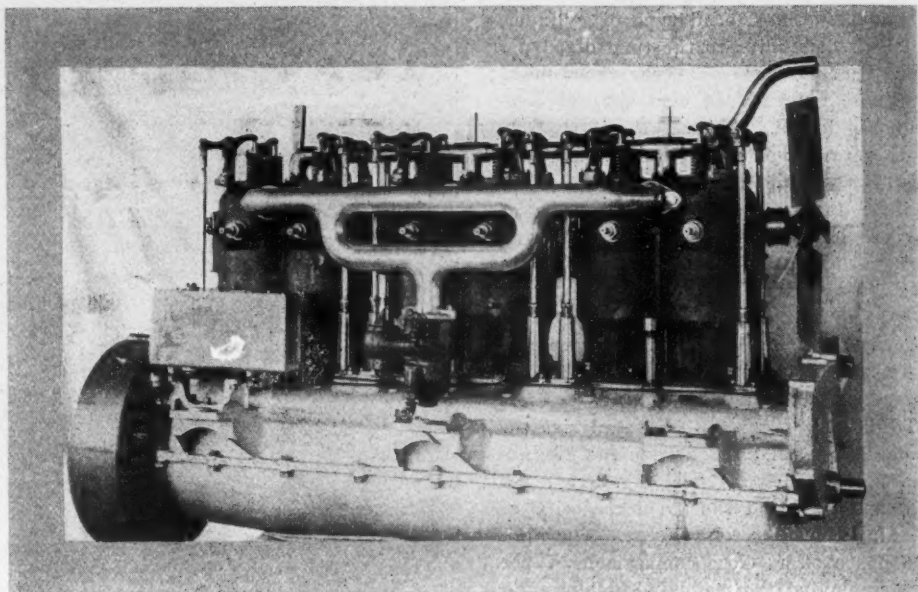
Before passing to other phases of the motor situation for 1910 a brief summing up of the tendencies of construction, as exemplified in these four classes of cars, may be interesting. To begin: All four favor the long-stroke motor, with the \$2,500 class the leader. In the first three classes the L-type of cylinder predominates, but in the \$4,000 class the T-head is victor. The valve-in-the-head type has a rather uncertain career, vacillating from 15 per cent in the \$1,000 class to 5 per cent in the \$1,500 class, to 8 per cent in the \$2,500 class, and 20 per cent in the \$4,000 class. Separately-cast cylinders are in the majority of the first two classes, and casting in pairs largely predominates in the two bigger categories. Thermo-syphon is in inverse proportion to the price, controlling as it does in the first two but surrendering to the pump in the second two. Double ignition systems practically break even with dual systems in the \$2,500 and \$4,000 classes; dual predominates in the \$1,500, and single in the \$1,000.



THE FALCAR MOTOR HAS A CRANKCASE OILING SYSTEM
EXHAUST AND OILER SIDE OF PREMIER 1910 MOTOR
THE CLEAN-CUT SIDE OF THE NEW COURIER MOTOR



STODDARD VALVE ACTION
THE MITCHELL EXHAUST VALVE
JACKSON VALVE ROCKER DESIGN



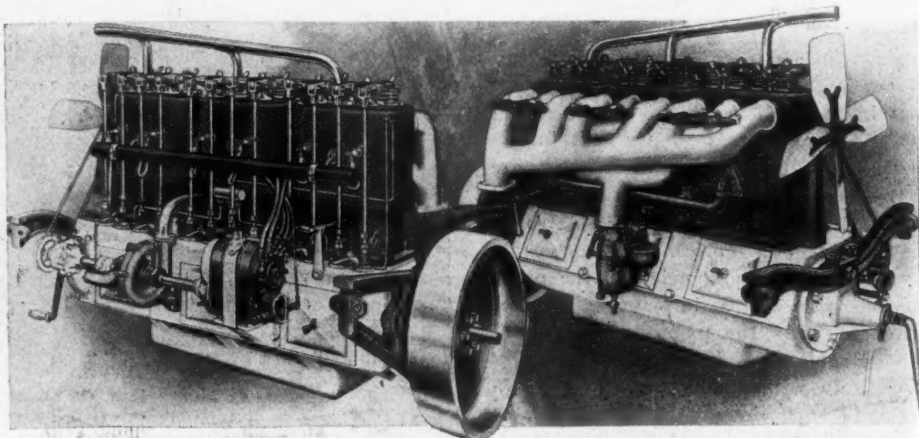
THE SIX-CYLINDER MOTOR USED IN PENNSYLVANIA CARS

Trend of American Motor Design

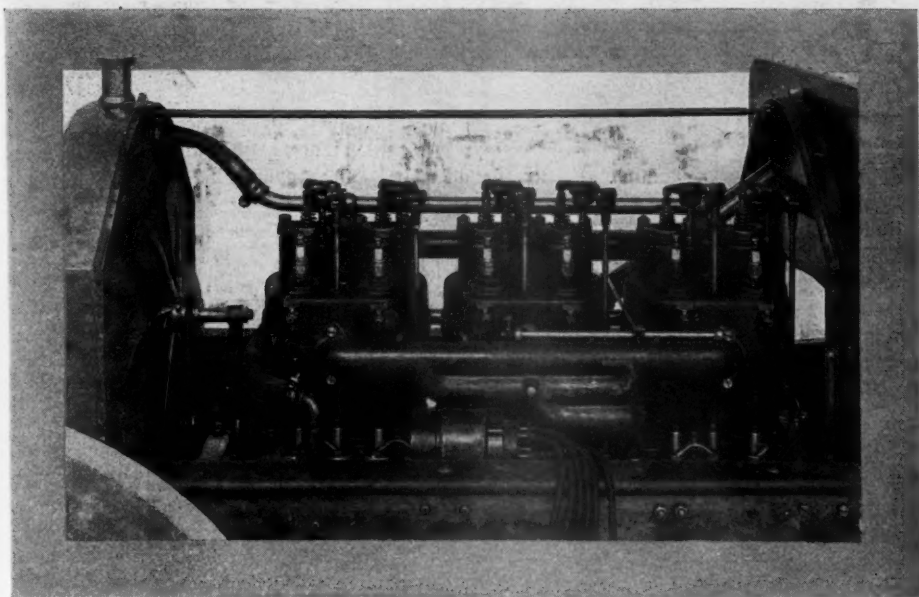
ONE can only comprehensively grasp the trend of motor design by examining the motors of 1910 and comparing where possible with the motors of the present year. Motor Age illustrates in the present pages many new types of motors that are making their debut at the Grand Palace show. Some of these motors are those new cars which were brought out during the past fall by recently-organized concerns and are being manufactured from 1,000, 2,000 and sometimes 3,000 and 5,000-lots for the coming season. It is impossible to classify these new motors, that classification depending largely on the factory organization, the price of the car and the number of cars to be turned out. Given these three factors, a person is in a good position to judge of the style of motor that will be used. In a low-priced car it is natural that cylinders will be cast en bloc, four in one casting; in the higher classes the cylinders will be cast in pairs with valves on one side; and the highest-priced classification of all the cylinders will be cast in pairs with the valves on opposite sides.

Cylinders En Bloc In Low-Priced Cars and In Pairs in the Two Other Classes

Let us look, first, at the tendencies with reference to bore and stroke. The square cylinder which was so much in vogue a year or so ago is losing out. By square cylinder is meant that type in which the bore and stroke are the same. We have, nevertheless, many manufacturers who, in spite of the tendency towards a longer stroke than bore, still continue to use the square type. Perhaps no better example of a concern with a variety of motors remaining firm with the square class can be cited than the Jackson, which has not fewer than five different sizes of motors for the coming season. Three of the five have the bore and stroke alike, being 4, 4½, 4¾-inches; in the other two the bore and stroke are 5¼ by 5 and 4¼ by 4½. By way of contrast with a concern manufacturing five different styles of motor, it is interesting to cite the opposite extreme, namely, a maker like the Mitchell selling



TWO VIEWS OF MOTOR USED IN STANDARD SIX CARS



NEW SIX-CYLINDER MOTOR OF MITCHELL COMPANY

For 1910 Dissected and Discussed

Spherical Combustion Chamber Seems To Be Preferable —New Engines on the Market

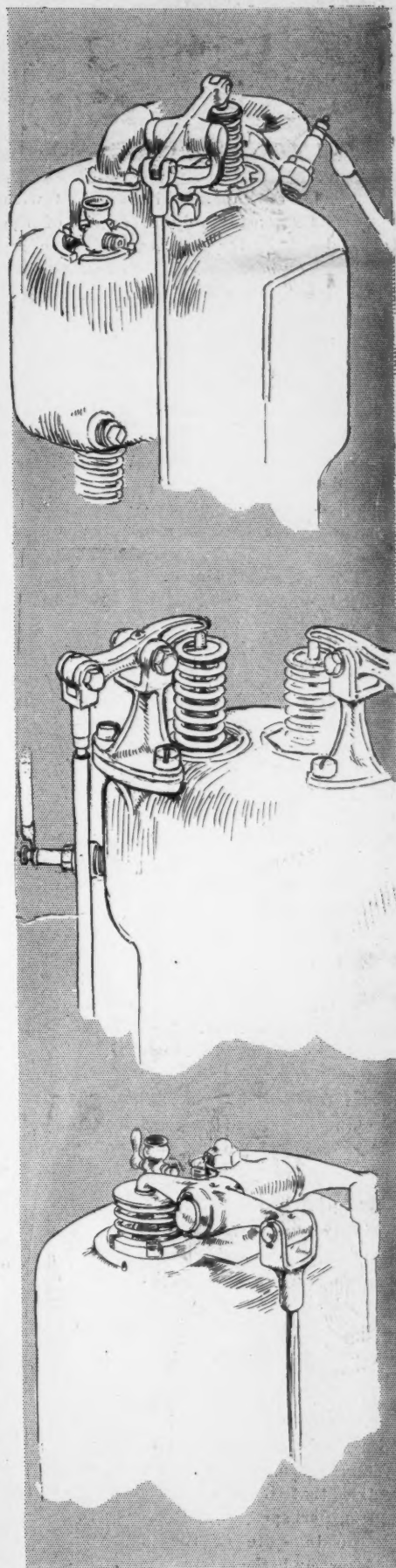
three different models of cars, but in all of which the same cylinder sizes are used, the bore being $4\frac{1}{4}$ inches and the stroke 5 inches. Cylinders of this size are used in the two Mitchell four-cylinder models as well as in the new six-cylinder which has been brought out for the 1910 market. The Kissel company is an exponent of the square type of cylinder. This concern builds three types of motors, two of which have the bore and stroke alike, and in the third they are practically the same. The sizes of these Kissels motors are $4\frac{1}{4}$ by $4\frac{1}{4}$, $4\frac{3}{4}$ by $4\frac{3}{4}$ and $4\frac{7}{8}$ by $4\frac{3}{4}$.

Long-Stroke Motor Progress

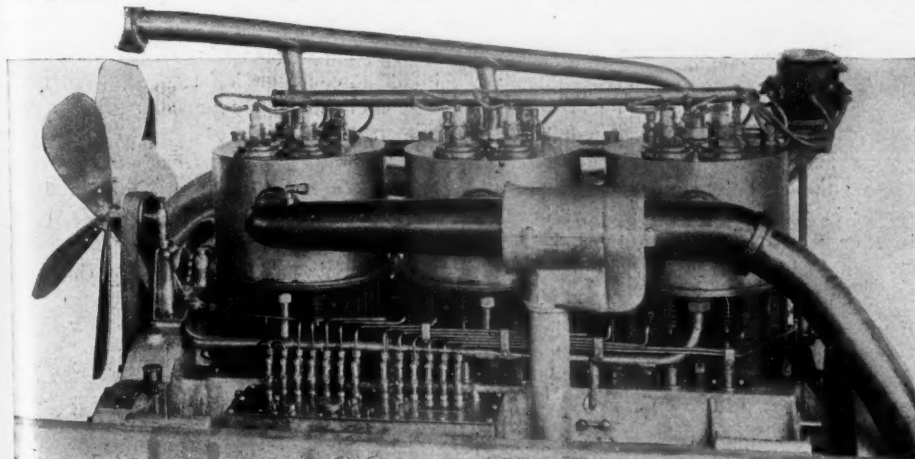
Many are asking regarding what progress the long-stroke motor is making or has made for 1910. Strictly speaking, we have not the long-stroke motor with us at present, excepting in one or two makes of cars which do not happen to exhibit at the palace show. The long-stroke motor,

as understood in Europe, has the stroke from $1\frac{1}{2}$ to 2 inches in advance of the bore; whereas in America, at the present time, it is rarely that the difference between them is so great. A few examples, however, will suffice to show the present trend in this direction. The Premier motors are made with $4\frac{1}{2}$ -inch bore and $5\frac{1}{4}$ -inch stroke. This year these motors had cylinders $4\frac{1}{2}$ -inches square, but for 1910 the bore has been left at this figure and $\frac{3}{4}$ -inch added to the stroke, bringing it to $5\frac{1}{4}$. In the National motor, with cylinders 5 by $5\frac{1}{8}$ inches, the bore has been increased $\frac{1}{4}$ -inch and the stroke $\frac{1}{8}$ -inch. This motor is, perhaps, the best example, or at least one of the best, of the long-stroke variety. In the little single-cylinder Brush runabout the stroke has been lengthened $\frac{1}{2}$ -inch for next year in order to increase the power. In the Marmon motor, with its cylinder $4\frac{1}{2}$ by 5, $\frac{3}{4}$ -inch has been added to the stroke. The Ford motor remains as at present, with $3\frac{3}{4}$ -inch bore and 4-inch stroke.

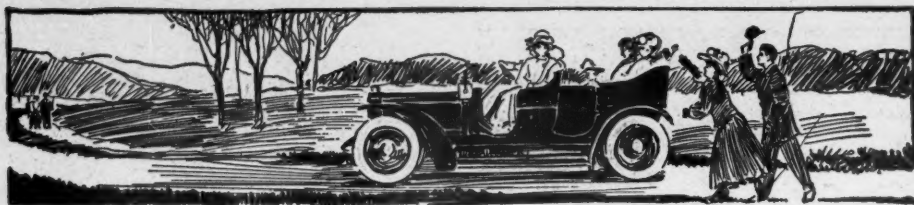
Looking at the other side of the question, there are not a few manufacturers



THE REO INTAKE VALVE
PENNSYLVANIA VALVE LOCATION
THE VALVES ON STANDARD SIX



THE CHADWICK SIX-CYLINDER WITH COPPER WATERJACKETS



who have during 1909 had motors with the stroke considerably in excess of the bore but who, for next season, have increased the bore in order to add the desired extra horsepower. One in this category is the Inter-State, with cylinders $4\frac{1}{2}$ by 5, in which $\frac{1}{4}$ -inch has been added to the bore to bring to its present measurement. Another example is the Mora, with cylinders $4\frac{1}{2}$ by $5\frac{1}{2}$ inches. In this motor the bore is $\frac{1}{2}$ -inch greater than formerly.

There are some makers of motors who, in order to get additional horsepower, have resorted to other means than that of increasing the bore or stroke. The time was when no manufacturer would listen to the argument that horsepower could be increased without adding to the bore or stroke, but now, thanks to the research of motoring enthusiasts, and the activity of our many engineering staffs, these same manufacturers are adding to the horsepower and leaving the two cardinal cylinder measurements alone. An example of how this may be done is by increasing the valve diameter. On the Halladay cars the valve diameters have been increased $\frac{1}{4}$ -inch. Another concern increasing the size of the valves is the Kissel company, whose 1909 valves were $1\frac{3}{4}$ -inch, but which valves for 1910 measure $2\frac{1}{2}$ inches. But this increase of power does not all rest with the size of the valve, the shape of the cam, or more strictly speaking, the contour of it has a direct effect on the horsepower generally. To this might be added the efficacy of the lubricating system employed; the accuracy of the grinding of the cylinder walls; the accuracy of scraping the crankshaft bearings; and, in short, the general high-class workmanship throughout the motor.

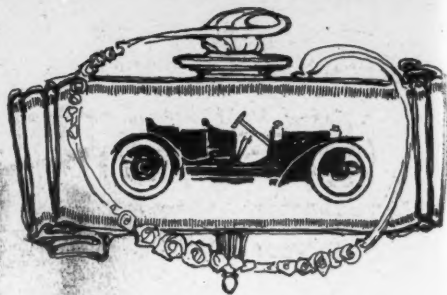
Thermo-Syphon Cooling

It is quite interesting to note the foothold thermo-syphoning cooling has on the manufacturers exhibiting at the Grand Central show. To the scattered or, more properly speaking, thin ranks of the pioneers of thermo-syphon cooling many additions have been made for 1910. Not a few of these are new faces in the industry, but others are old timers who have been convinced of the adequacy of this system for medium-priced cars, and who realize that it tends towards simplicity and is, perhaps, a little cheaper to manufacture in spite of the larger capacity radiator and the more capacious water-jackets which are necessary. The Jackson concern stands foremost as one of the old standbys in thermo-syphon cooling. From the days of their two-cylinder cars until the announcement of the pretentious four-

cylinder models for 1910 was made this company has consistently stood by thermo-syphon. The Gaeth, a Cleveland product, although made in relatively small numbers, has been a consistent demonstrator of this system of cooling. Since their inception the big army of Maxwell two and four-cylinder cars has stood stoutly by this system, and the horizontal brass band across the center of the radiator, indicating the intermediate water tank, has become a distinguishing feature of these cars. The Moline cars have been exponents of it for several seasons, and the Regal since its inception has been on this side. The Cartercar in one of its models is a convert to this system, and the Brush runabout and the Black Crow are allied in the thermo-syphon ranks. Taking a momentary glance at a lot of the new faces, it is interesting to find such names as Hupmobile, Cole, Paterson, Ohio, and Paige-Detroit in this classification. Not to be overlooked among the older makers are some of the Mora models and the Sultan.

Casting the Motor En Bloc

The en bloc casting is making progress, particularly in the low-priced cars. Three or four examples of it are illustrated on these pages. First comes the new Everitt, a Detroit product, in which the four-cylinder with their waterjackets are incorporated in one, but this manufacturer has gone much further and forms the upper half of the crankcase as a unit with the cylinders. In fact, we must not stop here, because half of the housing for the timing gears is a corporate part of this casting. In the new Courier car the en bloc casting is used, but the crankcase is entirely separate. This motor, like the Everitt, is a striking example of the simplicity of piping, there being but a single pipe entering one side conveying the mixture into the casting, which is cored to the intake valves of the four cylinders. There is a single water pipe from the radiator base to the waterjacket base; a single return water pipe from the casting head to the top of the radiator, and a single exhaust pipe. So simple do many of these en bloc motors appear that the observer is prone to ask what part is missing, or why the full equipment is not shown. Still another example of the en bloc, and one which is illustrated herewith, is the Empire. This motor differs from the conventional in this class in that the intake valves are on one side and the exhaust valves on the opposite side. Generally speaking, in this type of motor the valves are all on one side. The Lambert

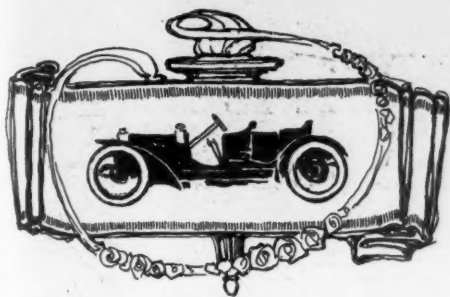


car uses an en bloc type for the coming season, and on the low-priced four-cylinder Jackson, which is illustrated, considerable novelty is displayed in that the cylinders appear cast in pairs, but they are integral with the top half of the crankcase, so that, while in reality appearing appear cast in pairs, yet they are integral. One direct result of the integral-cast motor is a reduction in the length of the bonnet. The days of the long bonnet or hood are passing. Those were the days when some manufacturers built solely for looks, entirely overlooking the riding qualities of the car, the extra wear on tires, because of mounting the tonneau in the rear of the back axle, and the cramped foot room. Today, thanks to the dissemination of knowledge and the increasing good sense of manufacturers, the bonnet is being reduced and the motor car is now becoming a balanced proposition. The days when it was all motor are no more, and now we are finding the body with the comforts of the passengers receiving its quota of attention.

The Six-Cylinder Motor

The six-cylinder motor naturally merits attention. It is on the increase. The days when one or two makes were known have given place to a goodly percentage of sixes, so that now upwards of a dozen concerns are exhibiting sixes at the palace show. Among the new concerns for 1910 which have adopted this type in one or more models are the Mitchell, Standard, made by the St. Louis Motor Car Co., Staver and Kline, the two latter being new concerns in the pleasure car field. The Mitchell six, illustrated in these pages, is but a 50 per cent increase on a four as far as the cylinder size and design are concerned. It locates the exhaust valve in the cylinder head, where it is operated by a rocker arm, and has the intake valves in offset chambers on the left side, these valves operating through direct lifter rods from the camshaft within the crankcase. The Standard six motor has cylinders cast in pairs and locates the intake and exhaust valves in the cylinder heads, using separate rocker arms for each valve. The Pennsylvania six follows much the same practice, although the disposition of the rocker arms is quite different. The Chad-





wick six continues with cylinders in pairs of the T variety and inclosed with copper waterjackets. The National company is marketing two sixes; the Premier continues its car of this type, as do the Kissel and Cameron companies.

Location of the Valves

The location of valves is a wonderfully interesting study with motor designers and one which invariably causes not a little discussion among the buying fraternity. There is no end to the questions asked by the buyers on the subject of additional efficiency occasioned by placing both intake and exhaust valves in the cylinder heads, or at least locating one of these valves in the dome of the combustion chamber. It is not a question of where the valve is located which determines the increased efficiency, but rather the shape of the combustion chamber. Those who have searched deepest into the vast unknown of hydro-carbon motor efficiency have agreed that the spherical combustion chamber is preferable to all others; that next to it comes that type which is possible with the L-head cylinder; and after this comes the combustion chamber of the T-head motor. If a maker decides to use the spherical combustion chamber, or the nearest we can approach to it, the most convenient place to locate the valves is in the cylinder heads. Some concerns mount them directly in the head, an example of which is the Standard six and the Pennsylvania, both of which are illustrated. Other concerns prefer to mount the valves at a slight angle to the vertical, inclining the intakes outward at one side and the exhaust valves outward at the opposite side. Examples of this are the Stoddard-Dayton and Jackson, the latter inclining the valve stems outward at opposite sides at approximately 45 degrees. Still others follow different devices. The Mitchell, as already stated, locates the exhaust valve centrally in the cylinder head, or centrally in the dome of the combustion chamber. In contrast with this is the new four-cylinder Reo motor, which locates the intake valve in this position and places the exhaust in an offset at one side.

Silent Knight an Example

Another example of the spherical combustion chamber, which is not exhibited



but will serve by way of comparison, is the Silent Knight sliding-sleeve motor, which uses a spherical combustion chamber, but which has the intake and exhaust ports, one at the right, the other at the left. These examples serve to prove the case that it is the combustion chamber and not the valve location that is the big determining factor in the matter of efficiency. To bring it down to a simple rule, the efficiency of the motor is increased in proportion as the surface area of the combustion chamber is reduced. The greater the surface area of this, the greater the amount of heat that is conducted off into the water in the jackets. The gasoline motor is essentially a heat motor, and these heat units, which pass into the water into the jackets, are wasted, whereas they should be converted into work.

New Motors On Market

There are several new motors on the market for 1910 which have been brought out by concerns in the market for several seasons, and a passing glance at these

may prove of interest. An example of this is the Moon company, which has brought a new motor 4¼ by 5 inches. This motor is illustrated. It has cylinders cast in pairs with opposite valves requiring two camshafts for their operation. Up to this time the Moon motors have used valves in the heads with an overhead camshaft and employing one rocker arm for opening the intake and exhaust valve of each cylinder. The company continues for next year the manufacture of this old type of motor also.

The Stoddard-Dayton motor has been improved in not a few regards. Up to the present this motor has used one rocker arm for opening the intake and exhaust valve of each cylinder, but for next year a separate rocker arm is used for each and two camshafts are now employed. The separate rocker arm allows of overlapping the valves—that is, having the intake and exhaust valve open simultaneously for a brief period at the end of the exhaust

(Continued on Page 93.)

THE FOUR AVERAGE MOTORS OF THE PALACE SHOW

AVERAGE—	\$1,000	\$1,500	\$2,500	\$4,000
Wheel base, inches.....	92	109	114	126
Front wheel, inches.....	30.6/31	33.3/35	34.7/40	36.3/42
Rear wheel, inches.....	30.5/31	33.3/36	34.8/41	36.3/45
Price of car.....	\$784	\$1,360	\$2,133	\$3,800
MOTOR—				
Number of cylinders—One.....	8			
Two.....	23	5	4	
Three.....				
Four.....	69	90	84	60
Five.....				
Six.....		5	12	40
Average bore, inches.....	3.83	4.10	4.41	4.82
Average stroke, inches.....	4.00	4.31	4.89	5.15
Average A. L. A. M. H. P.....	17.2	26.6	32.7	51.1
Average piston displacement, cubic inches.....	129.2	226.2	314.5	448.2
Average T type, percentage.....	23	20	28	58
Average L type, percentage.....	61	75	56	26
Valves in head, percentage.....	15	5	8	20
Two cycle, percentage.....			4	
Cylinders cast separately, percentage.....	54	50	24	20
Cylinders cast in pairs, percentage.....	23	35	76	80
Cylinders cast en bloc, percentage.....	23	15		
Water-cooled—Thermo, percentage.....	85	45	20	7
Cir. pump, percentage.....	8	40	80	93
Air-cooled, percentage.....	8	15		
Ignition—H. T. single, percentage.....	39	15	8	
H. T. dual, percentage.....	30	65	44	47
H. T. double, percentage.....	30	20	48	47
Make-and-break, percentage.....				6
Carbureter—Gravity feed, percentage.....	100	95	92	67
Pressure feed, percentage.....		5	8	33
Lubrication—Compression oiler, percentage.....	8	5		
Circulating pump, percentage.....	54	60	56	53
Gravity pump, percentage.....	8	15		
Mechanical oiler, percentage.....	15	10	28	47
Circulating, flywheel, percentage.....	8	10	16	
Gravity, flywheel, percentage.....				
Clutch—Mul. disk, percentage.....	61	40	52	33
Cone, percentage.....	15	45	40	53
Band internal, percentage.....	8	5	4	7
Band external, percentage.....				7
None, percentage.....	15	10	4	
Transmission—Selective 2.....	23			
Selective 3.....	8	60	96	53
Selective 4.....		5		47
Progressive 1.....				
Progressive 2.....	8			
Progressive 3.....	8	5		
Planetary 2.....	38	10		
Planetary 3.....		10		
Friction.....	15	10	4	
Drive—Shaft.....	62	75	92	100
Chains.....	38	25	8	



CARBURETER



HERE have not been many radical changes made in carburation during the past year and the majority of manufacturers are content to leave what they considered well enough alone. The carbureter situation occupies a somewhat peculiar position at the present time—a position, in fact, quite different from that which it occupies in Europe and particularly in England. With American car owners the consumption of gasoline is an insignificant factor in many cases, the result of which is that the economy phase of the carbureter has been deplorably neglected of late; in fact, economy of many cars is not as great today as it was 2 or 3 years ago. The car manufacturers are primarily not to blame for this but rather the buyers of cars. Owners and buyers have demanded a car with a motor of the utmost flexibility; carburation is one of the big factors in flexibility and yet possess economy to a marked degree. As a result many carbureter makers have been devoting their energies to producing a flexible carbureter and one capable of high speeds rather than a carbureter in which economy is a cardinal virtue.

A noted tendency of the year is that some makers, who heretofore have used a carbureter of their own design and manufacture, have cast in their lot with the big carbureter factories and now secure their supply direct from them. This is, in brief, an acknowledgment that a carbureter maker should understand better the

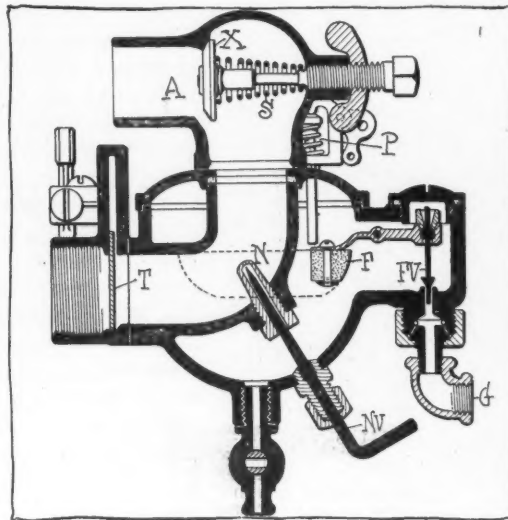


FIG. 1—SCHEBLER CARBURETER

field of carburation than a manufacturer whose major energies are devoted toward designing a car rather than perfecting a carbureter.

In the general field of carburation a few designs stand out so prominently under the spot light of inspection and analysis as to warrant concluding that such are proper milestones leading toward the ultimate goal of carbureter perfection. Undoubtedly one of the earliest is the venturi-tube mixing chamber, or strangling tube, as some might term it. Fig. 4 shows the conventional relationship of the nozzle N in

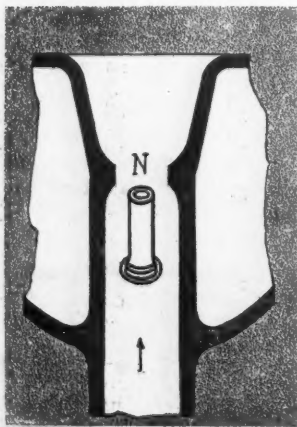


FIG. 2—SCHEBLER VENTURI

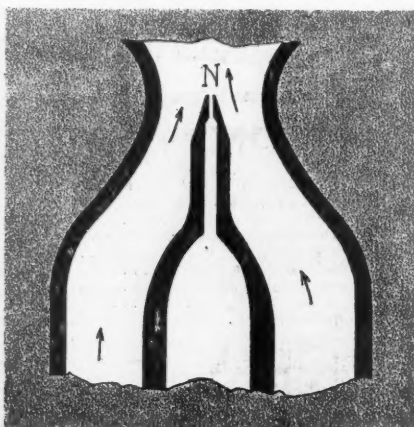


FIG. 3—STROMBERG VENTURI

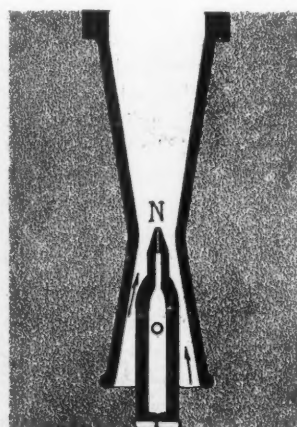


FIG. 4—TYPICAL VENTURI

CONSTRUCTION

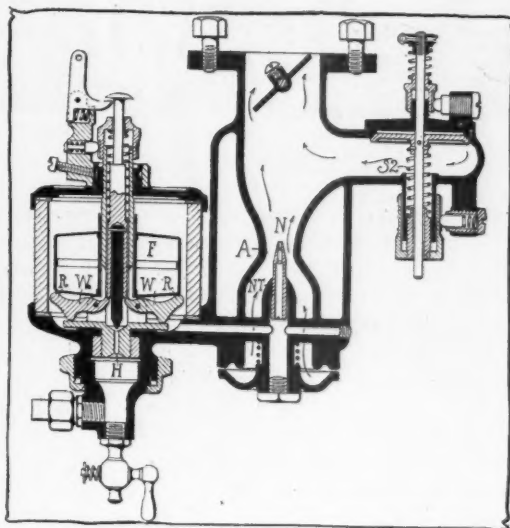


FIG. 5—STROMBERG CARBURETER

the strangling tube of venturi design, the arrows indicating the converging of the air currents at the tip of the nozzle N where the gasoline escapes and mixes with the air. The nozzle is located at the smallest-diameter part of the tube, so that the air currents converging at the tip of the nozzle immediately diffuse, thereby aiding in pulverizing the gasoline and producing a homogeneous mixture.

Fig. 2 shows the venturi construction of the mixing chamber in the Schebler carbureter made by Wheeler and Schebler, as well as the location of the nozzle N immediately beneath

the smallest diameter of the tube. The venturi effect in this design is graduated somewhat by the projecting ring on the walls of the tube immediately above the nozzle, rather than by the gradual slope of the walls.



The venturi design in the Stromberg carbureter of the Stromberg Motor Devices Co. is illustrated in Fig. 3. This design being more of the easy curve variety but with the nozzle N located at the smallest-diameter part. The reader will note the gradual curve of the air passage through which the air current sweeps in the directions indicated by the arrows. On another page, Fig. 9 appears the nozzle arrangement of the two-cycle Simplex carbureter. The walls of the strangling tube have a particularly long and easy curve. In this carbureter a long-pointed needle valve suspended from the cover of the carbureter, enters the top of the nozzle, and the gasoline escapes through a pair of horizontal passages which lead into the small part of the venturi, so that the air suction is greatest at these points.

The venturi design in the new Kingston, illustrated in Fig. 10, is conventional, excepting in that the top of the nozzle is an open receptacle of inverted cone contour, and the top of this receptacle is somewhat above the smallest-diameter part of the venturi chamber. A needle valve regulates the flow of gasoline through this nozzle.

Still a further type of nozzle is that employed in the Carter carbureter, Fig. 11. This is in

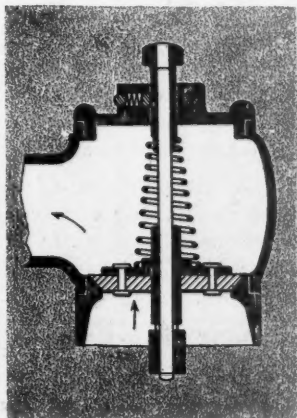


FIG. 6—SCHEBLER AUXILIARY VALVE

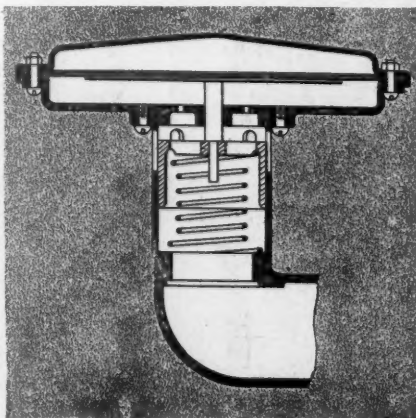


FIG. 7—CHADWICK AUXILIARY VALVE

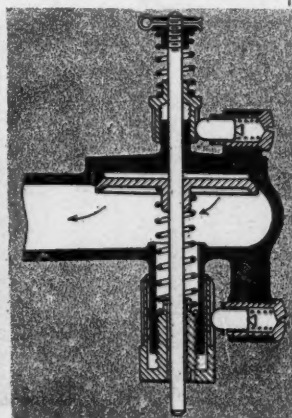


FIG. 8—STROMBERG AIR VALVE

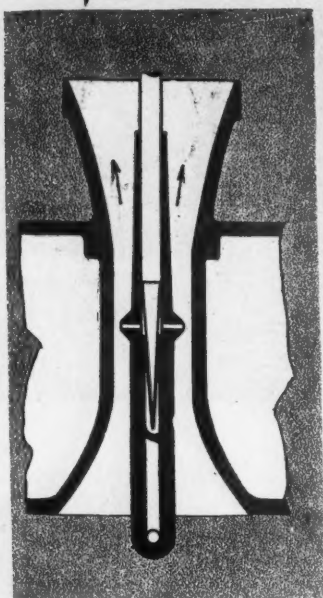


FIG. 9—SIMPLEX VENTURI

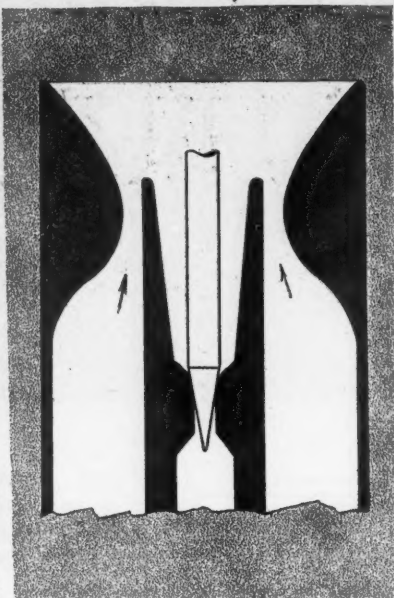


FIG. 10—KINGSTON VENTURI

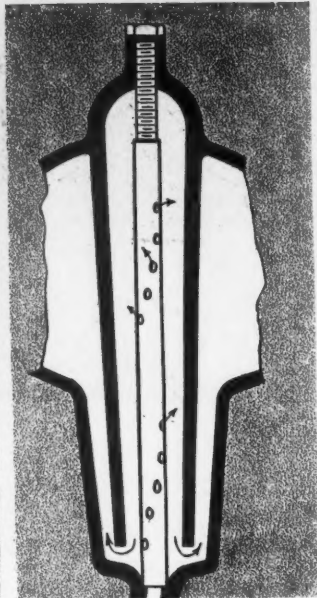


FIG. 11—CARTER NOZZLE

reality a multiple nozzle, in that the gasoline escapes through a spiral series of holes in the nozzle tube. The greater the motor demand the higher the gasoline rises in this tube and the more that escapes. The incoming air, as shown by the arrows, is compelled to pass downward through an inverted U-shaped chamber which incloses the nozzle tube.

The problem of auxiliary air valves remains much as it was a year ago. The manufacturers in 80 per cent of the cases come to the conclusion that an auxiliary air valve is a necessity and that it alone makes the automatic carburetor possible. For the novice it will suffice to say that the purpose of the auxiliary air valve is briefly as follows: With motor speed up to 500 revolutions per minute of the crankshaft there is a certain suction or pulling force exerted by the air on the gasoline in the top of the spraying nozzle, the gasoline resting $\frac{1}{8}$ inch from the top of this nozzle when the motor is idle. As the crankshaft speed is increased to say 1,000 revolutions, the pulling force of the air on the gasoline is greatly increased in that the current of air past the nozzle is much

faster. As the crankshaft speed increases to 1,500, this tendency grows and if other means were not provided too much gasoline would enter the mixture and it would not explode with sufficient rapidity for high speeds. As a result the carburetor manufacturer has introduced the auxiliary air valve which is generally opened by the pulling force of the air. This simple type of valve is one held closed by a coil spring, the spring being of such tension that at ordinary motor speeds the valve remains seated, but begins opening as the motor accelerates. The result of this is that there is a constant pull, or nearly so, on the gasoline in the nozzle and an explosive mixture of correct proportions is obtained for the different motor speeds.

The Auxiliary Valve

A few types of auxiliary air valves are illustrated. Fig. 6 shows the Schebler valve held seated by a conical spring, the object of using the conical spring being that it really acts as a double spring, in that the large-diameter coils compress first and the smaller-diameter ones later, so that there is a desired progression in the opening of this valve.

A different type of valve is the Stromberg, Fig. 8, in which two springs are made use of, one above and the other beneath the valve, so that the valve when seated can be considered as poised between these springs, and that when it opens the inertia of the valve has not to be overcome, and the sole resisting force is the spring tension. One spring acts in advance of the other, giving a progression of opening.

In Fig. 7 appears a different type of valve and one employed on the Chadwick carburetor. This is the diaphragm-controlled type, in which the valve is a piston variety held upward in its closed position by a spiral spring, but is pulled down against the spring tension by the air demand. The valve also connects with a diaphragm in a large-diameter compartment above the valve, this diaphragm tending to prevent fluttering of the valve and also offering the desired resistance to its opening and closing.

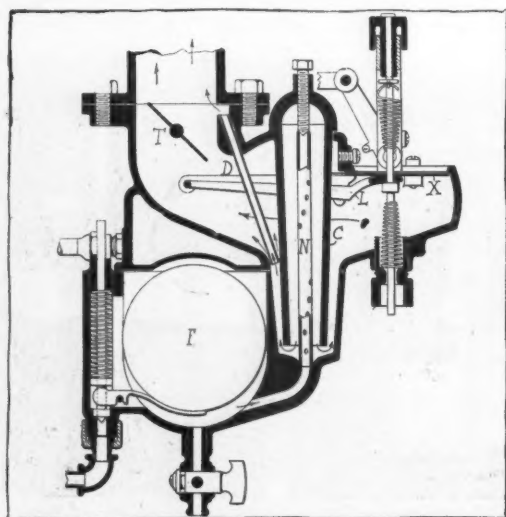


FIG. 12—THE CARTER CARBURETOR

An interesting type of auxiliary air valve, and one not illustrated, is that employed on the Kingston carbureter. This is the ball-valve type, in which the force of the air lifts a series of balls from their seatings, thus admitting air. The openings in the seats on which the balls rest are cups or inverted cones of different tapers, thus giving a progressive air opening. On the Planhard carbureter the ball type of auxiliary air valve is used, the balls resting on seats in which are openings of different diameters, so that the ball covering the largest diameter opening is lifted first and the others in progression thereafter.

The problem of float construction has crystallized down fairly well to the concentric type, which is illustrated in Fig. 14. By concentric float is meant that the float is ring-shaped, and that in the center of it the nozzle is located. This style of float is in contrast with that shown in Fig. 15 in which the float is in one compartment and the nozzle located in a mixing chamber to the side of it. The advocates of the concentric float point to its merits in that whether traveling on the level or going up or down hills the level of gasoline in the nozzle is maintained constant, and the danger of flooding or starving the motor is overcome.

Waterjacketed Carbureter

The waterjacketed carbureter is becoming generally adopted and where it is not used pipe connections are made so that warm air taken from the proximity of the exhaust manifold is made use of. Makers have justly concluded that provisions must be taken to prevent condensation of the mixture, while it is in passage from the nozzle to the cylinders.

In a hasty review of the different carbureters marketed for the coming season the general features of construction will be quickly recognized. The Schebler is shown in seven different types, all of which are characterized by concentric nozzle construction, and the use of the auxiliary air valve. Fig. 1 shows model D in which the main air intake and the auxiliary air intake are one and the same, this being partly obstructed, however, by a spring-controlled valve X past one side of which is free passage for normal air but with high speeds the valve X is open. The only gasoline adjustment on this carbureter is that of the needle valve NV, the point of which enters the opening of the nozzle

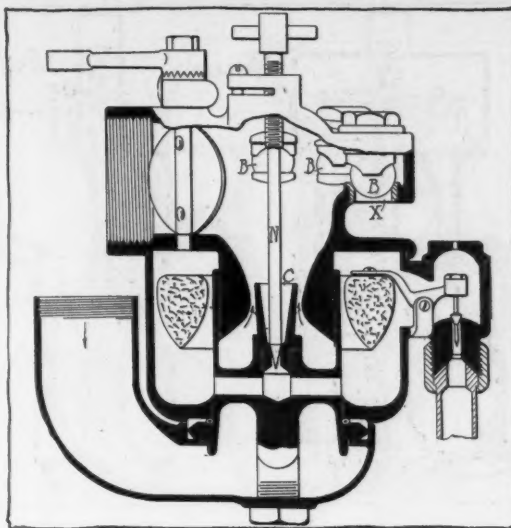


FIG. 13—KINGSTON CARBURETER

N. The model E. Schebler differs from this in that it has a central air draft, or passage A, leading direct past the nozzle, as well as an auxiliary passage, guarded by the valve X. The only gasoline adjustment in this is that by setting the needle valve in the nozzle. The model L Schebler, Fig. 20, has been brought out specially for racing purposes and is of different design in that it has a connection between the throttle T and the needle valve, so that with every opening of the throttle there is a proportionate opening of the needle valve, thus assisting in regulating the flow of gasoline and proportioning it with the air. Separate adjustments are provided whereby the amount of lift of the needle valve with relation to throttle opening can be furnished for intermediate and high speeds. This carbureter also has a gasoline adjustment for low speed in the needle valve.

The Stromberg carbureter is shown in two types—one, Fig. 5, being the original design with a separate float compartment, the walls of which are a glass barrel, so that at any time the workings of the float can be watched. The spraying nozzle in these carbureters is a feature, in that there is no needle valve, the automatic regulation of gasoline being solely accomplished by the auxiliary air valve. This carbureter has a priming cup at the base of the nozzle into which all overflow drips, and this overflow mixes

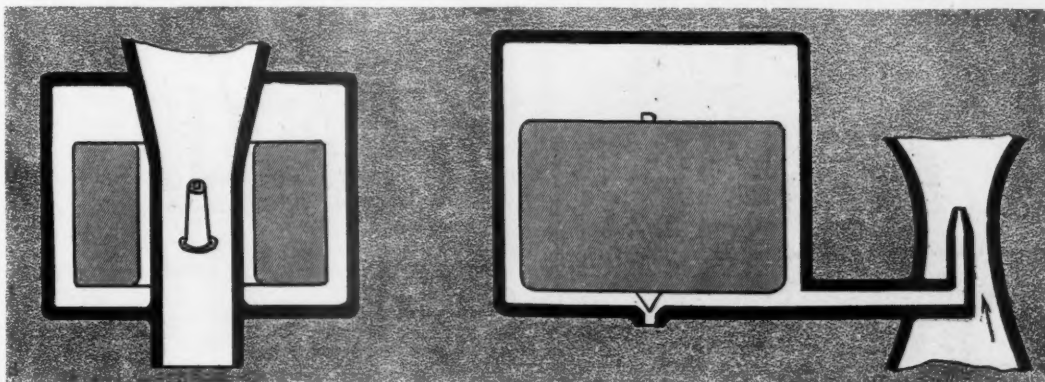


FIG. 14—CONCENTRIC FLOAT

FIG. 15—NON-CONCENTRIC FLOAT

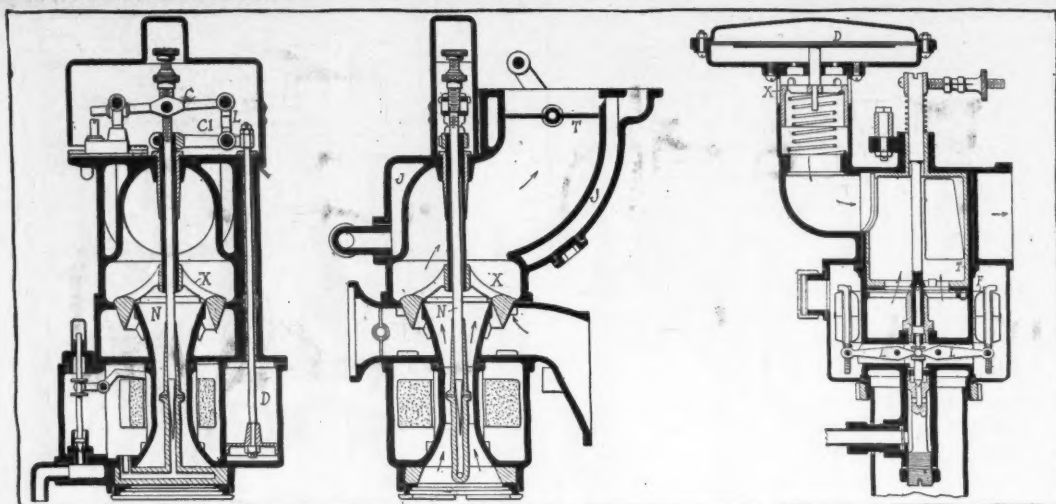


FIG. 16—SIMPLEX CARBURETER

FIG. 17—CHADWICK CARBURETER

with the air and assists starting. Another Stromberg type, Fig. 18, is of the concentric variety, but in other respects it is the same, excepting in that it is without the waterjacket for the mixing chamber.

The general design for the new Kingston appears in Fig. 13, in which the cup-shaped nozzle C appears, the flow of gasoline being under regulation of the needle valve N. This carbureter has a series of balls B serving as auxiliary air openings, the operation of these balls having been previously referred to. This carbureter is of the concentric type and is particularly compact.

A Novel Design

The Carter carbureter, a new one on the market, offers several innovations, all of which appear in Fig. 12. This carbureter uses a seamless copper ball float F. The nozzle is a tube closed at the upper end and having a series of fifteen holes arranged spirally in it and through which the gasoline escapes. The air enters through the top of the tube C surrounding the nozzle, this course being indicated by the arrow. A throttle T regulates the mixture passage from the motor and the by-pass tube D is arranged and which opens into the manifold

between the throttle and the motor, so that with the throttle closed enough mixture will pass through this tube to keep the motor running. The automatic regulation consists of an air valve X held seated between upper and lower springs, the upper spring for low speed openings, and the lower spring coming in for higher-speed work. Provisions are made so that the auxiliary air valve may, if desired, be controlled by the driver from the dash.

An interesting carbureter and one designed specially for two-cycle work is the Simplex and used in the two-cycle models of the Simplex Motor Car Co., two sectional illustrations of this appear in Fig. 16. This carbureter is of concentric design and has an auxiliary air valve X mounted directly above the top of the venturi mixing tube. This auxiliary valve is a ring with wedge-shaped cross-section and as it is lifted a progression of opening is accomplished by the wedge design. Its operation is solely automatic, the pull of the air lifting the air valve X. In order to avoid a fluttering action and also to increase the flow of gasoline with the opening of this auxiliary valve an interconnection is made with the needle valve N, so that this valve is lifted proportionately with every lift of the auxiliary air valve. This is

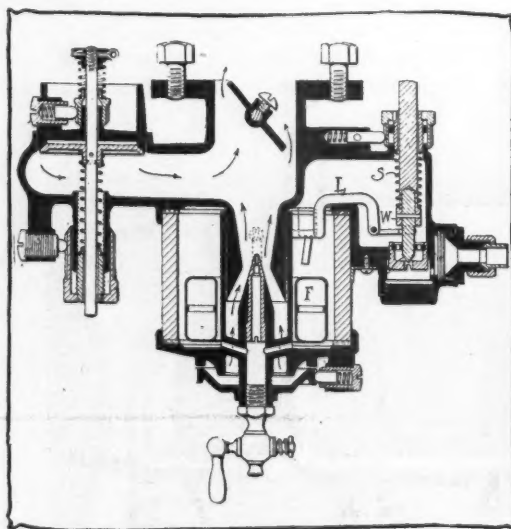


FIG. 18—STROMBERG CONCENTRIC

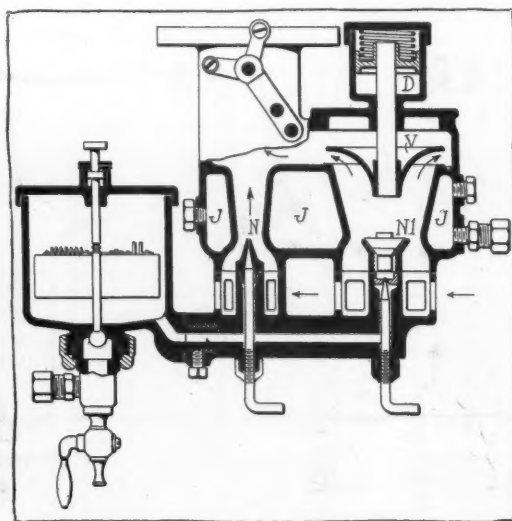


FIG. 19—WILLETT CARBURETER

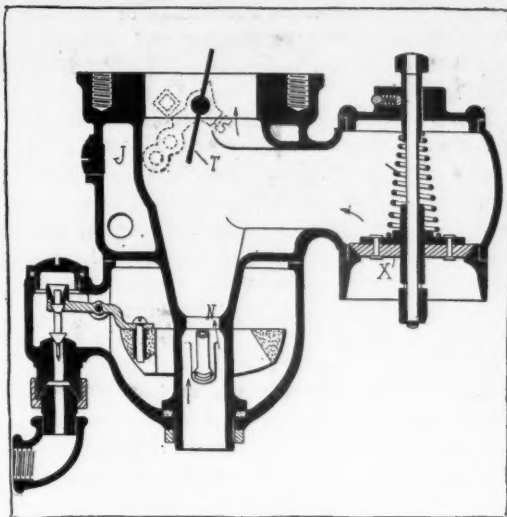


FIG. 20—MODEL L SCHEBLER

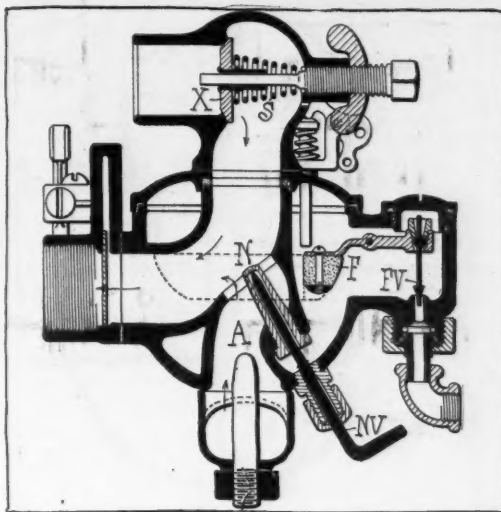


FIG. 21—MODEL E SCHEBLER

accomplished by a combination of levers C and C1 respectively attached to the needle valve and the auxiliary air valve and through the linkage L connected with the dash pot D. This inter-relationship offers an automatic feature of air and gasoline regulation which is claimed to have given entire success. The dash pot D is intended solely to prevent fluttering of the auxiliary air valve. This illustration shows the careful and complete waterjacketing of the entire mixing chamber, with the object of preventing condensation of the mixture.

Another concern which uses a carburetor of its own design and manufacture is the Chadwick used on the Chadwick six-cylinder cars. Fig. 17 shows the general arrangement of this carburetor, which has a particularly well-worked-out scheme of adjustment. It operates on the concentric float principle, the float F being of metal, and visible from the exterior through a glass at one side of the carburetor which shows the level at all times. The spraying nozzle is centrally located and projecting into it is a needle valve connected with the stem of the throttle T, so that with opening and closing of the throttle the regulation of gasoline is accom-

plished. But the Chadwick carburetor goes further in this regulation means. There is an auxiliary air valve X of the piston type which is under control of a coil spring and the diaphragm D. The air from this valve enters through a port shown in the left top of the throttle, so that as the throttle opens or closes it, to an extent, opens and closes the passage through which this auxiliary air enters. But there is still a further regulation of the throttle, in that as it is rotated to regulate the speed it varies the diameter of the opening around the spraying nozzle, so that a desired suction on the gasoline in the tip of the nozzle is maintained at all motor speeds. This valve around the nozzle is similar to that of the shutter in a camera so that the opening is always a circular one. Adjustments are provided on the top of the carburetor for any nature of inter-connections between the throttle and the needle valve in the spraying nozzle.

No Auxiliary Valve

The Gaeth carburetor, made specially for Gaeth cars, is shown in Fig. 24. This carburetor is not of the concentric-float type, but has the

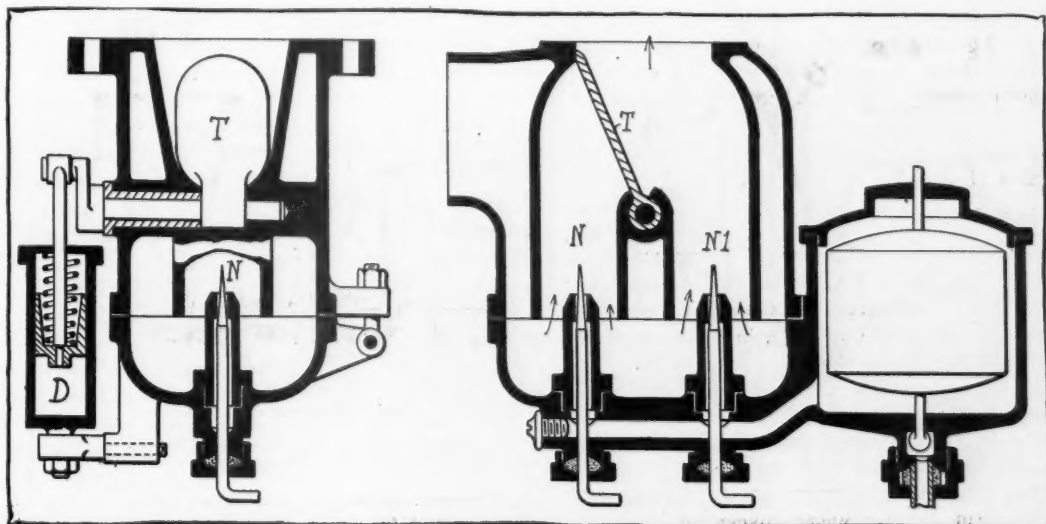


FIG. 22—THE ECONOMY CARBURETER

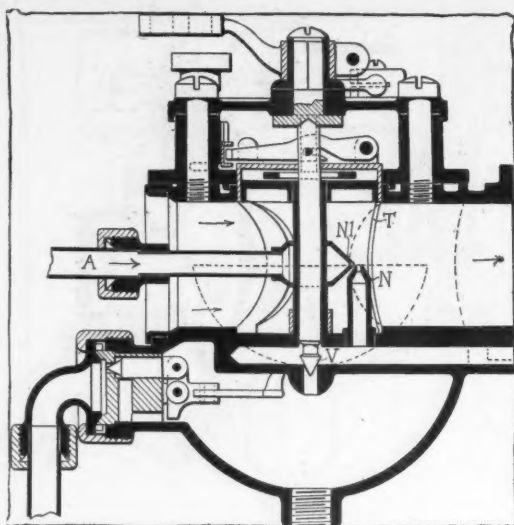


FIG. 23—ANDERSON'S CARBURETER

throttle T and needle valve N inter-connected so that a movement of the throttle changes the gasoline opening in the needle valve. The throttle, is one of the big factors in this carbureter, and has a peculiarly graduated exit opening E controlling the passage of the cylinders. The throttle, as illustrated, is a revolving barrel and in addition to controlling the exit passage has ports P in its base, so that the amount of air passing the nozzle N can be regulated at will. No auxiliary air valves of any nature are required.

Multiple-Jet Carbureter

Two examples of the multiple-jet carbureter are on exhibition. The Willet made by the Willet Engine and Carbureter Co., shown in Fig. 19, has two nozzles N and N1, the former a smaller one for starting and low-speed work. The larger nozzle N1 is ordinarily out of commission due to a spring-controlled valve V entirely closing the port on top of the venturi tube above it. This valve is obedient to control of the dashpot D in which is a coil spring tending to seat the valve. As the motor speeds up, however, the nozzle N is not competent to supply mixture in sufficient capacity with the result that the air suction lifts the valve V from its seating, thereby bringing the larger nozzle N1 into commission. The nozzle N1 is a compound type, the gasoline from it exiting through a series of small passages instead of through one main opening. This carbureter is copiously water-jacketed, the jackets spaces J entirely surrounding the two venturi tubes in which the nozzles N and N1 are located.

A Second Type

The Economy carbureter is being marketed by the Otto Sales Co., importers of the Sauer truck. This carbureter is a very conventional device of the double-jet type, in which a swinging door T controls the larger nozzle N1. The nozzle N is ordinarily in commission, and N1 is brought into service automatically by the demand of the motor for additional air. This demand opening the door T, bringing it in a vertical position at which time both of the nozzles furnish gasoline for the mixture. The controlling valve T is connected up with the dash-

pot so that undesirable fluctuating or vibrating of it when suddenly opening and closing is avoided. This carbureter is completely water-jacketed.

The Gilbert Mfg. Co. is at present marketing the Bowers carbureter, which is before the public in practically the same form as it was a year ago. In brief, this carbureter, which is not illustrated herewith, is of the vertical draft venturi type design, with an auxiliary air valve arranged concentrically with the top of the venturi strangling tube. The auxiliary air valve is, in short, a metal disk with a series of three or more openings, each opening guarded by a metal leaf spring, the springs being of different tension, so that the weak ones open first and are followed at regular intervals with the others, thus giving a desired progression in the amount of additional air furnished.

A Unique Type

Several other makes of carbureters are on exhibition in different parts of the Grand Central Palace. One is the Duryea made by the Watres Mfg. Co. This carbureter employs a ring-float F and has the main air intake A protected by a gauze which filters the inlet of air. A peculiarity of this carbureter is the diaphragm D which by raising owing to the demands for air by the motor permits additional air to enter and at the same time raises the needle valve through the trunnion T which fits near the spiral slot S in the stem of the valve. The result of this is a proportioning of the air and gasoline for all motor speeds.

A carbureter to make its appearance during Bennett, made by the Wilcox-Bennett Carbureter Co., and shown in Fig. 26. Of foremost interest in this is the standpipe P in the side of which is a series of miniature openings M. The needle valve N is adjustable. At low speeds the gasoline escapes only from the lower opening in the pipe P, and according to the motor speed the gasoline rises in this pipe and more of the openings are required. The auxiliary air valve is a conventional type X obedient to the control of a conical spring.

A New Maker

A carbureter to make its appearance during the past fall is the Anderson, built by the Anderson Carbureter Co., and a cross-section of which is illustrated, Fig. 23. This carbureter is somewhat different from the ordinary in that the

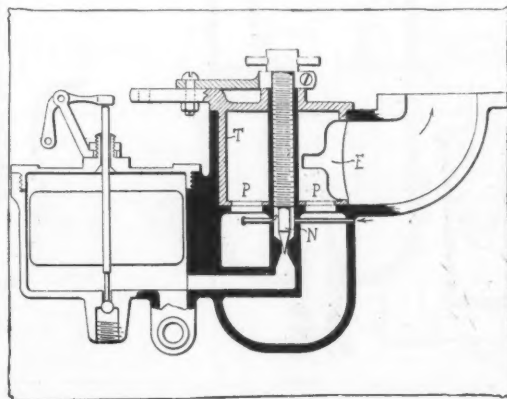


FIG. 24—GAETH CARBURETER

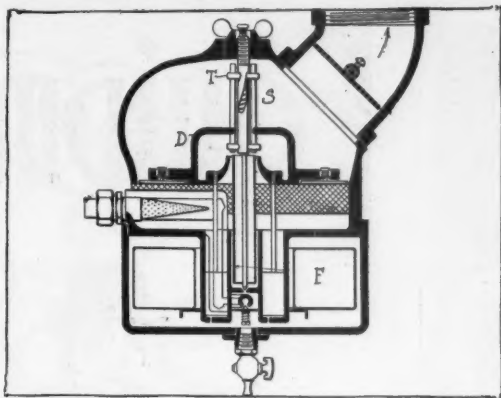


FIG. 25—DURYEA CARBURETER

nozzle N has meeting it what appears to be a second nozzle N1, but which is, in reality, a horizontal air passage A through which part of the air enters and this air is directed against the tip of the nozzle from which the gasoline escapes, the action being identical with the atomizer so well known in household circles. The needle valve V is not located in the nozzle, but is under control of the vertical drum-shaped throttle T through an ingenious cam and lever arrangement whereby it is raised in the usual manner to admit more gasoline with every opening of the throttle. The throttle consists of two concentric drums, one revolving within the others so that their opening begins at a small diameter circle at the nozzle and increases, remaining at all times a circle surrounding the nozzle. It is, in short, an iris type. In Fig. 23 is shown the nozzle N with the halves T and T1 of the throttle partially open showing the iris action of this with the nozzle N always in the center.

The Siro carbureter has been changed in models A and B for next year. The link connections operating it have been eliminated and a quarter gear connected to the shaft which operates with the throttle substituted, so that the lost motion is eliminated.

Final Summary

In conclusion it is a safe statement that although the points denoting progress are not very numerous, there nevertheless have been notable advances made by several of the carbureter manufacturers. Not a few of these are in the better materials used and in the more careful manufacture of the different parts entering into the make-up of the completed apparatus. Whereas a year or two ago ordinary metals were used as points for the needle valves controlling the entrance of gasoline into the float chamber, today special metals are used for the valve, and in some cases its seating so that the dangers from roughing of the seat are greatly reduced. In several of the factories the finest watch factory lathes are used for making these small and yet most important parts, and after they are machined the grinding process is carried out with the greatest accuracy.

The question as to whether the cork or the metal float is the better has not approached any nearer a solution during the year, those exponents of cork claim that they procure the finest grades of the highest qualities and by the

double and often triple treatment with shellac the cork is rendered practically soak proof. Those using the metal float have by special care in manufacture made this controlling device as nearly leak-proof and enduring as it is possible to make it. One manufacturer has struck a pace all of his own by the introduction of the ball float, the exact status of which will be better known in the course of a year or more. At present it appears as if there is good scope for it, but only time will answer the question finally.

No tendency is more conspicuous this year than the interconnection of the throttle with the controlling valve in the spraying nozzle so that the amount of gasoline fed is in a definite proportion to the quantity of air. A few years ago it was only the few who followed this course, but today practically 50 per cent of the makers follow this procedure, and as previously stated, some even go so far as to vary the size, or diameter, of the air entrance around the spraying nozzle so that on low speeds a richer mixture is obtained than on higher speeds. A departure that will merit watching with not a little care is that of making it possible to control the auxiliary air valve by hand from the dash should the occasion demand. There are some merits to this, but it is questionable if the results obtained are due compensation for the energy expended, by the actual work done as well as by having on one's mind the thought that such work must at times be done.

There is as much diversity in throttle design as there was two years ago and it is doubtful if this feature of construction will come any closer to a settlement for several years to come. Where reasonably good results are desired the conventional butterfly throttle is used, as shown in the Schebler, Stromberg and other models. There are those concerns, however, who make their own type and use a specially designed throttle. One of these already referred to is the Gaeth, in which the throttle plays a double role of regulating the exit of the mixture and also regulating the opening around the spraying nozzle. In the Chadwick a special design of throttle is used and in the new Anderson type an iris-design has been adopted, so that no matter what opening the throttle is at said opening is always a circular one and the spraying nozzle is located opposite the center of this opening.

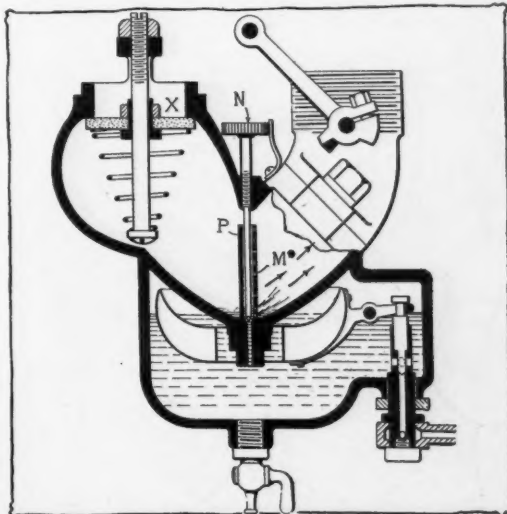
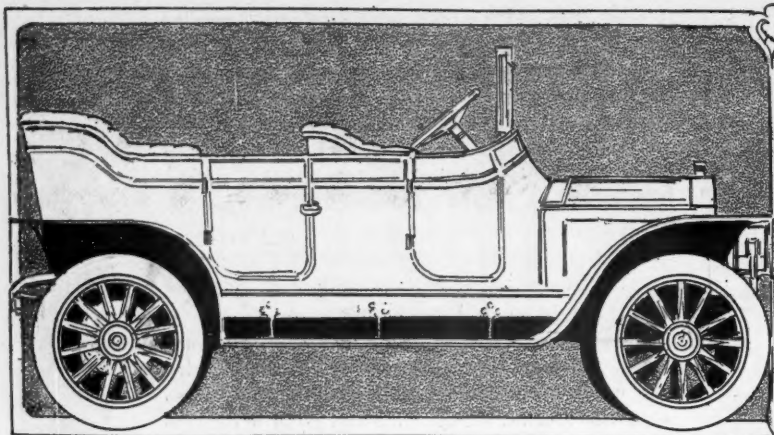


FIG. 26—BENNETT CARBURETER



THE CLEAR-CUT, INTERNALLY-EQUIPPED TOURIST OF THE FUTURE

A FEATURE of motor car construction which has come in for no small amount of consideration, as may be readily seen from a review of the 1910 models now on exhibition, is that of the baggage carrying facilities and the arrangement of miscellaneous accessories. There is a decided movement this year toward clearing the running boards of all accessories and equipment which can be conveniently placed elsewhere, a commendable advancement which makes for a more ship-shape appearance of the car in general, and gives easier access to and from the seats; so that the passengers may get in and out of their places without climbing, so to speak; and at the same time, this has been done in most cases without encroaching upon that space generally provided for baggage while on tours. Baggage, in the strictest sense of the word, applies chiefly to articles of clothing and small personal effects, or trunks, suitcases, etc., which a traveler carries with him on a journey; and which are quite essential to comfortable touring. Therefore tools, batteries, tires, fuel and acetylene tanks and generators, would hardly come under this head; but as these are all necessities on a tour, and take up space, a few words in regard to their disposition or arrangement might be of interest.

In the majority of cases the tools are carried in a neat metal box of large proportions, on the left running board, just opposite the front seat. There is a decided increase in the size of the tool boxes this year, and as for convenience, a more desirable place could hardly be found on the outside of the frame. There is a portion of the left running board of a tonneau car just opposite the front seat, which can be and is very conveniently utilized for this purpose, although a perfectly clear running board is more pleasing to the eye. The advantage of a tool kit in this location is its accessibility, and if it is not so large as to

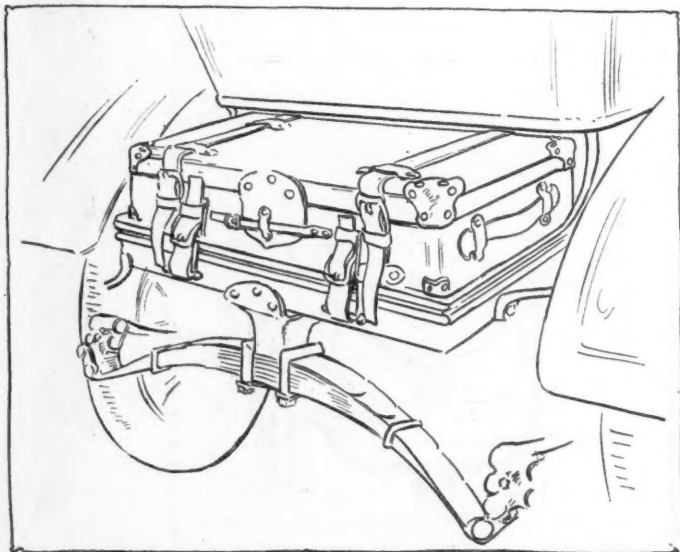


FIG. 1—BAGGAGE TRUNK ON MORA CARS

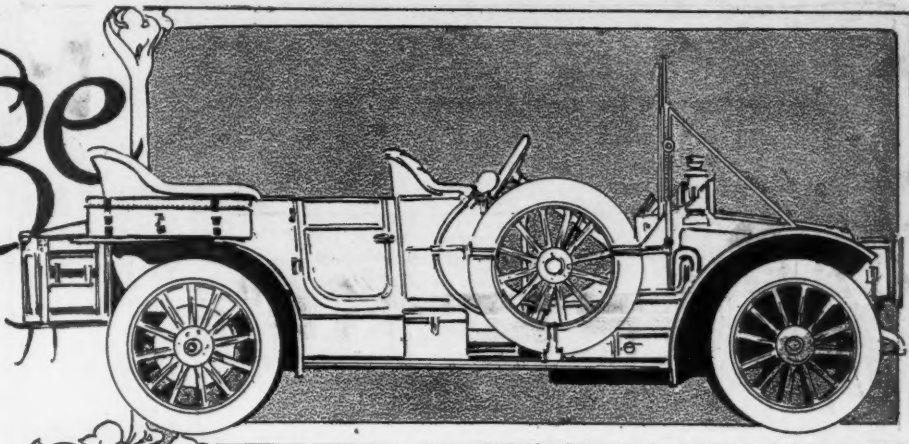
Equipment and



make ingress and egress awkward or inexpedient this position is most suitable. Another feature, which is greatly appreciated by the motorists, is the disposition on the part of some conscientious manufacturers, of dividing the boxes into compartments designed especially for the tools which they are to contain, with a place for everything and everything in its place. Wooden trays are provided for the smaller tools, and every wrench, screwdriver, chisel, pliers, etc., rests in its respective depression where it is held firmly and noiselessly; in less than 1 minute the entire contents of a large tool box can be laid out on the running board, and after a roadside repair has been made, a glance at the tray will suffice to show the operator that all tools are, or are not, in place. Another advantage of a large box in this position is that the tire pump, the jack, and the tire repair outfit are get-at-able without disturbing the passengers in the tonneau.

Perhaps one good reason why more manufacturers do not provide more facilities for carrying baggage is that the more provisions there are for carrying baggage, the more baggage will be carried, and in all probabilities, as often is the case now, their products will be loaded far in excess of the capacity for which they are designed, with the result that springs will flatten out or break, axles will be sprung, tires will be overloaded and short lived, the frame may sag to such an extent as to cause serious misalignment between the motor, transmission and other working parts, and at the end of a long tour a car, which under a normal load would have been none the worse for its journey and few

Baggage Space



THE OFT-SEEN TOURIST WITH ITS PARAPHERNALIA EXPOSED

the motor car equipment out of sight and well protected from rain, mud or dust will be found—which, by the way, will do away with much brasswork and make cleaning less laborious. There is plenty of space between the running boards and the frame of the car throughout their entire length which might be closed in with a long, strong box, in which tools, batteries for ignition and lighting, an acetylene gas tank, side curtains, extra oil and grease cans and other essentials could be very conveniently carried. Acetylene generators could be carried under the floorboard of the front seat and a trapdoor made in the floorboard to give access to it. The bodies on some cars now extend back, below and behind the rear seat to enlarge the space under it. It would not be very difficult to start this extension from the top of the back of the rear seat and make therefrom a large, clean, water and dust-proof cabinet, accessible from within or outside of the tonneau, in which an ample supply of necessary personal effects could be carried.

On the Stoddard-Dayton touring cars the gasoline tank is suspended from the frame at the rear. This leaves the entire space under both seats for the top curtains and extra luggage.

The Stearns cars are quite conventional and representative in the way of baggage-carrying facilities and the disposition of their equipment. In the 15-30-horsepower or small car the gasoline tank is located under the front seat; the battery is confined in a metal box on the right runningboard, and the tools are carried in a large box on the left side just opposite the front seat, this arrangement leaving the space under the rear seat for the top curtains and extra luggage. In the larger models the same arrangement is followed out, except that the gasoline tank is carried beneath the frame at the rear, a trunk rack is attached above it and the space under both seats may be used for extra luggage.

hard knocks, will be returned to the factory to be practically rebuilt, or to be subjected to a thorough and expensive overhauling.

There is a prevailing idea in the minds of many motorists that a motor car can, without detriment to itself, carry just as many passengers as can be crowded into it, and just as much luggage as can be strapped or tied onto it. The very fact that its foundation or framework is of iron or steel leads them to believe that it is incapable of fatigue. The constantly increasing interest in touring, however, makes it necessary for the manufacturer to give special attention to the subject of adequate provisions for carrying baggage, tools and the miscellaneous articles necessary to the convenience and comfort of the passengers, and vast improvement has been made in this direction since the days of the little, cramped, rear-entrance tonneau cars of a few years ago. Even with the very roomy tonneau of today, however, the carrying of suit cases in the tonneau usually subjects the passengers to inconvenience, and to strap them upon the running board means that they will be splashed with mud and water and scratched and rubbed to an extent that will prove their ruin in the course of a few long trips.

To reflect or take a peep into the future, it seems quite possible that in time the running boards will be entirely free from all tanks, generators, tire-casings, tool and battery boxes, etc.; the body lines will be smooth and graceful, and unbroken by misplaced and bulky accessories; ample provisions for carrying

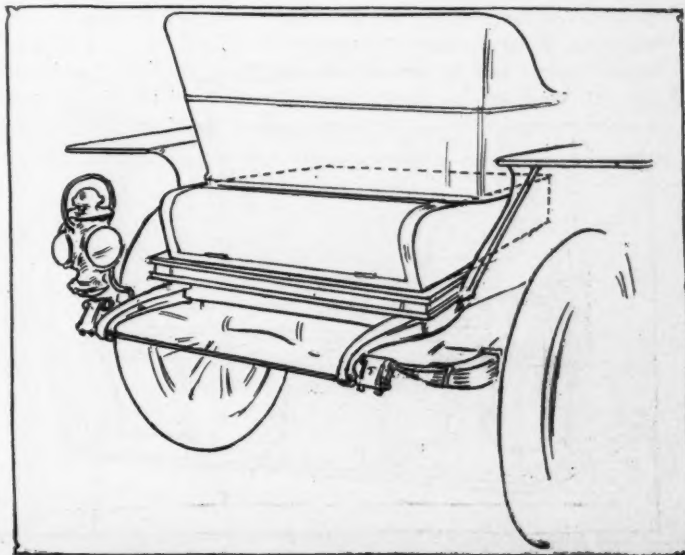


FIG. 2—REAR SEAT COMPARTMENT OF SPEEDWELL CARS

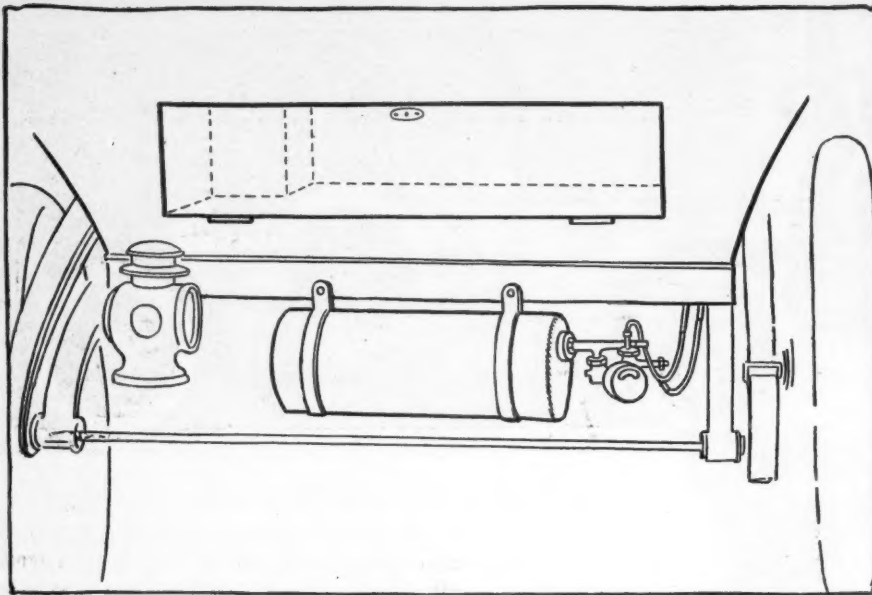


FIG. 3—RAMBLER PREST-O-LITE CARRIER

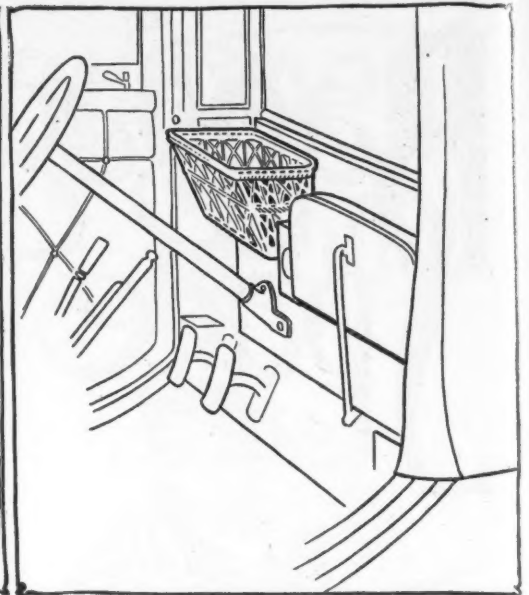


FIG. 4—FIRESTONE DASH BASKET AND SEAT

The acetylene generators, in the majority of cases, are attached through suitable brackets, either to the body as above described, or to the frame, or to the running board; and in a position close in, near the frame, opposite or forward of the front seat, and perhaps oftener on the right than on the left side.

The batteries, when not occupying a place in the tool-box or under one of the seats, are generally carried on the right running board in an insulated metal box as shown in Fig. 9, this being a sketch from the right side of an Inter-State touring car. The acetylene generator shown in this illustration occupies practically the same position as that of the Chadwick, except that it is on the opposite side.

In Fig. 8, which illustrates the rear end of the American four-passenger roadster, there are two compartments under the rear seat, as indicated by the dotted lines, which might be used for the storage of inner-tubes, waterproof coats, etc.; another compartment under the entire width of the front seat may be reserved for the side curtains, a lighting battery, a tire pump, a jack and other necessities. Tools and an auxiliary oil tank are carried in a neat metal box on the right running board just opposite the front seat; and as shown in the illustration, a rigid trunk rack and brackets for two tire casings are conveniently placed respectively above and in back of the gasoline tank behind. And in order to render the running boards as free from bulky obstacles as possible, and give easy access to the seats, the ignition battery B is disposed between the left side member of the subframe and the transmission case T as shown in Fig. 10. This is an ingenious location for the battery, for, generally, it is only necessary to give attention to this source of electrical energy on an average of once a month, and by raising the front floor section, it is brought into full view, can be readily tested or removed for charging, and a more conveniently out-of-the-way place could hardly be found.

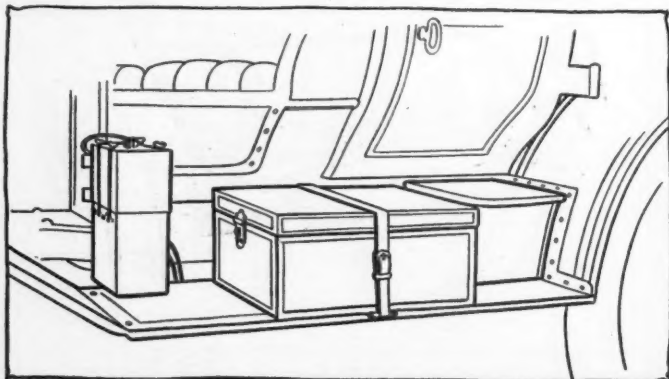


FIG. 6—CHADWICK TOOL BOX AND GENERATOR

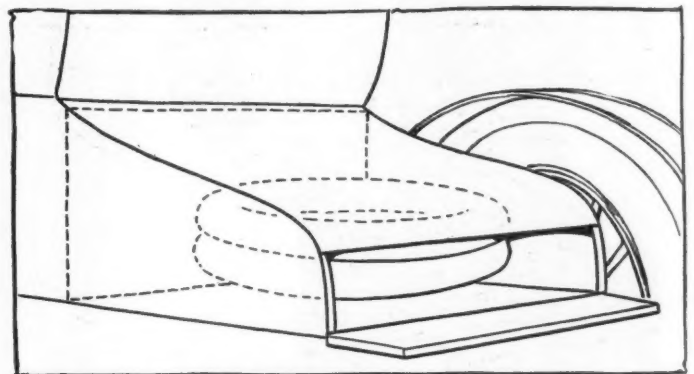


FIG. 5—FORD TIRE SPACE ON COUPE MODEL

There is plenty of room under the bodies, between the frames, of most cars, which might be used to a very good advantage, and judging from the way in which several manufacturers have utilized this space, one might be safe in believing that eventually the dustpan will extend back to the rear end of the frame, and the entire space for several inches under the body from the dash to the rear end of the car, will be cleverly filled in with accessible compartments especially designed for extra batteries, tire tubes and casings, tools, acetylene tanks and generators, and, in fact, everything which heretofore has been scattered.

A number of prominent manufacturers are fitting acetylene gas tanks to their 1910 models as regular equipment, and every effort has been made to attach them securely, in some secluded place where they may be easily reached, readily changed, and where their pressure gauges may be seen without difficulty. The most suitable location for an acetylene tank, as chosen by the Rambler company, is shown in Fig. 3. The tank is suspended from the rear end member of the frame where it does not interfere with the general symmetry of the car, the gauge may be easily examined, and being provided with a double valve adjustment, it is not necessary to regulate the lights every time they are put into service. After the permanent adjustment is properly set, it is only necessary to turn on the service valve and light the lights, there is no danger of getting the lights too high and burning the brass, or too low and requiring adjustment. All baggage compartments under the rear seats of the enclosed Rambler models are accessible from the rear, as is also depicted in this illustration, and a special division is provided in one corner for a lighting battery. In the touring models the ignition battery and the small tools are carried in a metal box on the left running board; there are side pockets in the doors, pockets in the seat coverings in back of the front seats, and a large space under the

rear seat as shown, except that it opens into the tonneau. Almost all tonneau doors are provided with inside pockets, and the little compartment in the arm which separates the two front seats of many cars has again come into vogue. These recesses are very convenient for storing gloves, goggles, route books and other small articles which are frequently used.

A very neat and useful little parcel basket is to be seen in the inside driven coupe models of the Firestone-Columbus cars, Fig. 4, a feature which will be more appreciated and found most handy by the women on their shopping expeditions and by the doctor as a place for his satchel, etc. This, however, does not complete the baggage-carrying facilities in this type of car. The rear decks of most coupe cars afford a most commodious compartment for tire tubes and casings, with plenty of room left for a jack, a pump, a tool-kit, a can of oil, grease, and carbide, and for many other articles of necessity. The spaciousness of one of these compartments is shown in a sketch of the rear deck of a Ford coupe, Fig. 5. The Stoddard-Dayton limousine cars are provided with three capacious running board lockers on each side, with specially constructed trays for tools and other small articles, as illustrated in Fig. 7. These are very neat and very accessible; and combined with the room under both the front and rear seats the available space for baggage in these cars is equal, and perhaps greater, than in any other car of the enclosed body type.

The Mora cars still retain the special touring trunk as regular equipment, as shown in Fig. 1. These trunks are similar in appearance to a small steamer trunk, are designed to properly fit on and into a specially-made platform and recess at the rear end of the body and are securely held into place by two heavy straps which are attached to the trunk and pass through two brass cleats on the platform. They are made of a special waterproof material which is impervious to the weather, not easily soiled, readily cleaned and durable. The tools are carried under the rear seat, as are also the side curtains, a large metal box is fitted to the right running board for the batteries, tire irons are fitted to the

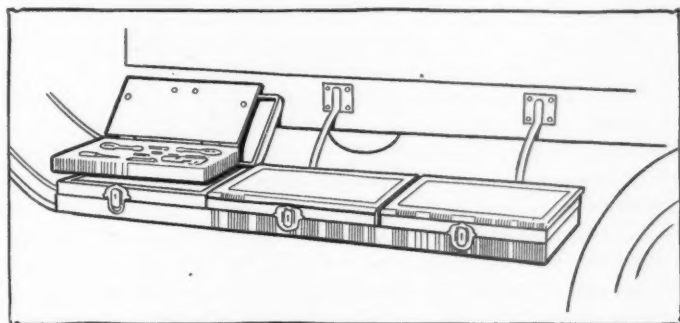


FIG. 7—ON STODDARD LIMOUSINE'S RUNNING BOARD

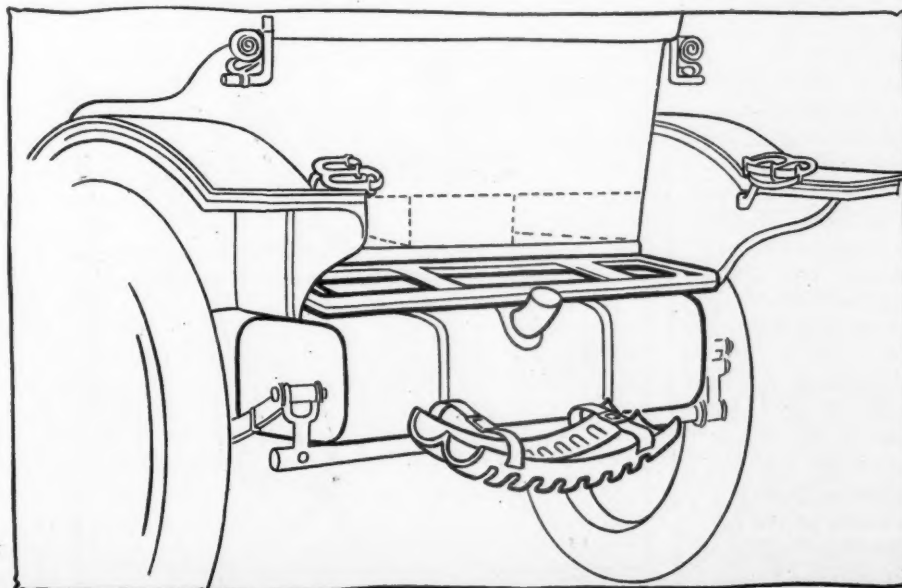


FIG. 8—AMERICAN TIRE SUPPORT AND BAGGAGE RACK

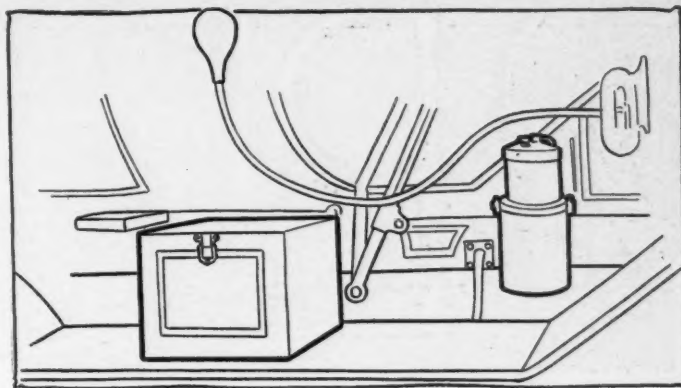


FIG. 9—ACCESSORY ARRANGEMENTS ON INTER-STATE CARS

dash, the running board, and at the right of the driver's seat, and the acetylene generator is attached to the frame at the left of the front seats.

Speedwell cars also show that the facilities for carrying excess luggage have been given a due amount of consideration. The rear end of the baby tonneau car, Fig. 2, is designed with a special extension, which is accessible from under the cushion in the tonneau or from the rear; this makes a compartment large enough to hold at least two regulation sized suitcases, and a number of other smaller articles; and an extra trunk rack can be fitted if required. The tools of this car are carried in a steel toolbox on the left running board opposite the front seats, while the batteries occupy a corresponding position on the opposite side; and the acetylene generator is bolted direct to the side of the frame between the front seat and the dash. The conventional pockets in the doors are provided, and a roomy little pocket is formed in the arm between the two front seats.

To sum up, the general tendency is: to first clear the running boards of all equipment that can be conveniently placed elsewhere; second, to place those articles for which a more practical location cannot be found, in more symmetrical positions, with regard for the adaptation of the shape or dimensions of the several articles to each other, and a regularity in form and arrangement. Tools are generally on the left running board, while the batteries are contained in a similar box on the right. Acetylene generators are in many cases placed at the left of the dash to balance with a horn or tires at the right; and acetylene tanks are in several cases conveniently suspended from the frame in the rear. In all cars having the gasoline tank in the rear under the frame, the space under both seats may be utilized for luggage, and trunk racks are generally applicable to all cars and furnished as extra equipment.

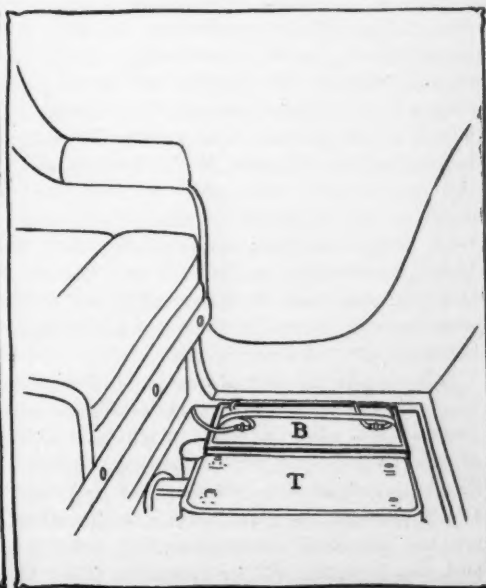


FIG. 10—AMERICAN BATTERY LOCATION

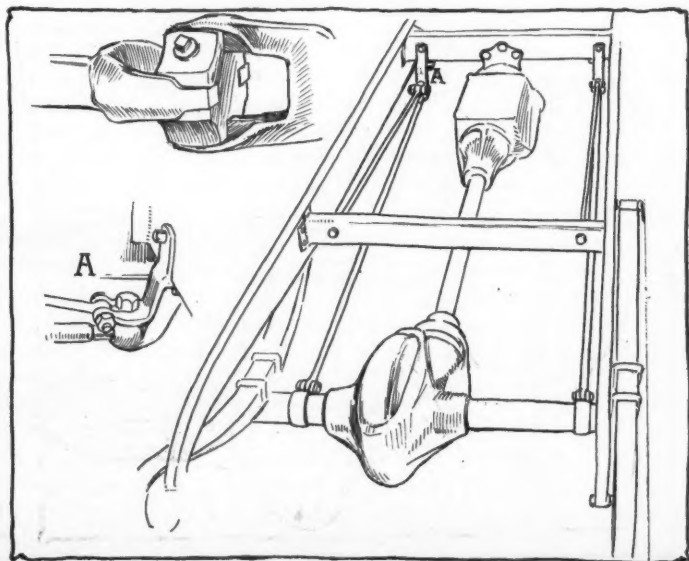


PLEASURE

Stoddard-Dayton—For next year the Stoddard-Dayton cars are manufactured with three sizes of motors, mounted on seven different chassis sizes, the motor types being 30 horsepower with $3\frac{3}{4}$ by $4\frac{1}{2}$ -inch bore and stroke, 40 horsepower with $4\frac{1}{8}$ by 5-inch bore and stroke, and 50-horsepower with $4\frac{3}{4}$ -inch bore and stroke. A change in the motor is the use of two rocker arms for each cylinder, there now being one rocker arm for opening the intake valve and another for opening the exhaust. The casting of cylinders in pairs is retained, as is the use of the spherical combustion chamber. Although two rocker arms are now employed for each cylinder, this has been accomplished very cleverly in that both rocker arms are carried on a single yoke and offset so as to avoid staggering of the valves. The exhaust valve is now held in place by a double yoke, and a change of note is that the intakes are now on the right side and the exhausts opposite, the exact reversion of this year's position. This new arrangement allows of carrying the magneto and water pump on the left side and the carbureter on the right. The two sets of spark plugs are not located on opposite sides of the motor, and with the Delco ignition system the coil is carried under the bonnet, so that the dash is simplified to this extent. The same system of motor lubrication is used, in which a rotary gear pump is employed in the crankcase and which distributes oil through a manifold located within the crankcase to the several bearings' parts. Double ignition is used on all models, the current sources being battery and magneto. On the 50-horsepower models the two systems are Bosch magneto and the Delco arrangement, the latter being described in the accessory department of the present issue. On the 30 and 40-horsepower models the Splittorf dual system is used. In the complete line a slight increase in wheelbase length has been affected. The appearance of the car when seen from the front has been altered by the adoption of the cellular type of radiator. In the rear three-quarter elliptic springs have taken the place of the semi-elliptics formerly employed, and locating the gasoline tank under the chassis at the rear is also a 1910 introduction, the feed to the carbureter being by pressure. In the transmission system a new universal joint is used between the gearbox and the propellershaft and in which the leather boot previously used is eliminated. A brake-equalizer has been inaugurated and greater braking surface obtained by increasing the diameter of the brake drum. Both brakes are on the rear wheels, the pedal one being of the contracting type and the lever brake of the expanding variety. A French type of rear wheel has been adopted in which the brake drums are bolted to alternate spokes. A new chassis for next year is the 30-horsepower one, designed solely for closed or town cars. Its wheelbase measures 108 inches and is designed to carry limousine, landaulet or town car bodies.

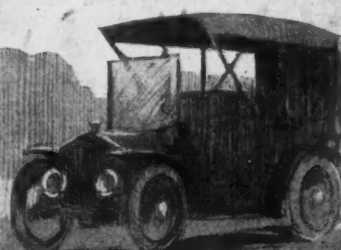
Reo—While the Reo Motor Car Co. continues the production of its one and two-cylinder cars in limited numbers, its new four-cylinder will have the right of way and will make up 80 per cent of the 1910 output at the Lansing factory. In brief, the new Reo motor has twin-cylinder castings, the cylinders having a 4-inch bore and $4\frac{1}{2}$ -inch stroke, while other features of the car are the left-hand steering control, three-quarter-elliptic springs and the dropping of the frame in front of the rear axle, thus permitting of the use of three-quarter springs, and allowing the

motor and transmission to be carried sufficiently low. Shaft-drive is used and also a multiple-disk clutch, the latter being contained in an oil-tight compartment in the flywheel. The gear-set is three-speed selective and internal and external brakes are fitted on the rear wheels. The front axle is an I-beam forging. Of interest in the Reo is the valve situation, it being noted that the inlets are directly in the cylinder heads, and the exhausts are at ports on the right side. This permits of opening the exhaust by a direct lift and operating the intakes through rocker arms, so only one camshaft is used which is incorporated in the crankcase at the right side. A quiet motor is secured by all the valve-lifters being adjustable and having fiber inserts. Both sets of valves are of the bevel-seated type, electrically welded to the stems. The one-piece crankcase has two large openings on the right side, furnishing access to the lowering bearings of the connecting rods, and the forward half of the crankcase contains an oil reservoir which is cast integrally with it and which carries the oil supply for the circulating system. The end bearings of the crankshaft are supported on end plates so that the bearings may be adjusted from the outside. The crankshaft, which is a manganese steel forging, is offset from the center line of the cylinders so that on the explosion stroke of the piston the angularity of the connecting rod is less than where the crankshaft bearings are located in the center plane of the cylinder. Side thrust with valve-lifters is avoided by offsetting the camshaft from the center line of the valve-plunger guides, while the camshaft runs on three bronze bearings, the timing gears being spirally cut and revolving in a bath of oil. One noticeable point about the motor is that there is only one grease cup on it and that is located on the camshaft. A magneto is part of the equipment, a battery being also supplied for starting purposes. Cooling is affected by means of a fan and a centrifugal waterpump operating from the magneto-shaft. Also additional cooling is had by means of the flywheel, which is formed with propeller blade spokes between the clutch and the rim. The radiator is of the vertical flat-tube variety, and



RANDOLPH UNIVERSAL; RAMBLER REAR AXLE DRIVE

CARS

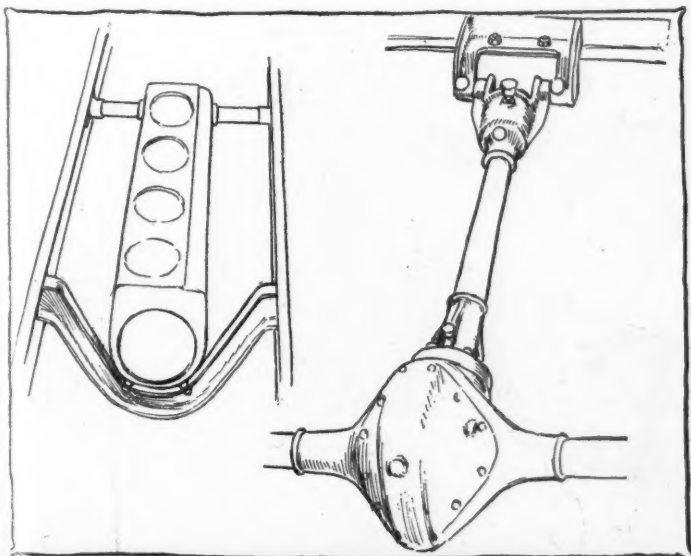


the clutch is multiple-disk. In the semi-floating rear axle system the propellershaft is inclosed in a tubular housing which acts as a torsion tube. There is only one universal joint between the gearset and back axle, this being inclosed in a spherical casing which forms the upper end of the torsion tube.

Premier—The Premier models for 1910 will consist of two chassis, one with a four-cylinder 40-horsepower motor and the other with a six-cylinder 60-horsepower motor. Each of these chassis will be fitted with four types of body construction, whereas only two types were supplied this year. These will consist of a roadster, baby tonneau and five and seven-passenger touring bodies. The tire and wheel equipment is increased to 36 by 4 inches in front and 36 by 5 inches rear, whereas in 1909 34 by 4½ and 36 by 4½ were used respectively on the front and rear. An increase has also been made in the size of the motor cylinders, for in the 1909 cars the cylinders were 4½ inches square, and in the 1910 models they will have a 4½-inch bore with a 5¼-inch stroke. In the 4-40 models the radiator has been changed from a flat tube to one of the honeycomb type and has been set a trifle back of the front axle. A non-vibrating four-unit coil is used on the ignition system to replace the single-unit coil previously employed. A number of improvements, or rather refinements, have been made in the lubricating system. The frame is also heavier this year, having been provided with a special reinforcement, while improvements have also been made in the rear axle bearings. The rear spring suspension also differs in this year's models in that the elliptic springs of previous years have been replaced with three-quarter elliptics. The lengthening of the wheelbase from 124 to 138½ inches in the 6-60 model and one or two other minor changes in dimensions have made it possible to increase the space between the back of the front seat and the front of the rear seat 4½ inches. The mechanical changes are practically the same in both cars with the exception of the wheelbase; the runningboards on all cars are inclosed between

their inner edges and the frame, and aside from the mechanical changes above mentioned and a few minor changes, such as a slight lowering of the seats in the roadster models, the fitting of boots on steering connections and the enlargement of the combination gasoline and oil tank, the line is practically the same as that of 1909. The bodies are all more of the straight-line type; the motor cylinders are of the T type and cast in pairs, with the valves located on opposite sides. Lubrication is by splash in the crankcase, and oil leads from a mechanical oiler, gear-driven off the camshaft, to each pair of cylinders and with one lead to the crankcase. A gear-driven centrifugal pump, the cellular radiator and a four-bladed belt-driven fan are features of the cooling system. Two independent ignition systems—one a high-tension jump spark and the other a low-tension make-and-break, are provided. A battery furnishes the ignition current with the jump-spark system, while an imported Bosch magneto supplies the current for the low-tension make-and-break. Carburation is conventional and a float-feed Schebler carburetor and a gravity feed from the supply tank.

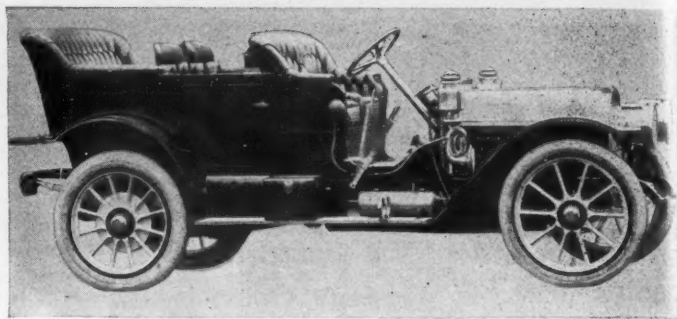
Rambler—No two-cylinder cars are included in the Rambler classification for 1910, the Kenosha concern pinning its faith to the four and offering three chassis, model 53 using square cylinders with 4½-inch bore and stroke, which gives a horsepower rating of 32.4, and models 54 and 55 show 40 horsepower with a 5-inch bore and a 5½-inch stroke. Only in cylinder sizes do the three chassis differ, the chassis layout being about the same as in 1909, with the exception that there is a new expanding type of clutch and a mechanical lubricator located under the floor board at the left and reached by means of a door. In the 1910 Rambler motor, the magneto now is found near the front of the crankcase, which forward position has been made possible through the moving of the centrifugal water pump to the front of the timing-gear housing. The magneto is supported on a bracket, which in turn is fastened to the side of the crankcase; the magneto being driven from an extension of the pumpshaft. A clutch coupling in the shaft permits of its being taken off easily. The cylinders are individual castings, and the crankcase is of one piece, there being a particularly large inspection opening on the right side, through which the lower bearings of the connecting rods can be reached. As might be expected, the offset crankshaft is continued, the offset being 25 per cent of the stroke, the idea being to reduce the angularity of the connecting rod on the explosion stroke so there is less side thrust of the descending piston on the left side of the cylinder wall. This idea is declared to give an increase of from 4 to 4½ horsepower with a crankshaft speed of 1,300 revolutions a minute. The crankshaft itself is a three-bearing one, which is mounted in a tubular crankcase. The new exhaust manifold is of the ejector principle and is a one-piece casting with branches from the cylinders which direct the exhaust at an angle toward the rear into the main pipe, thus preventing back pressure being set up in any one of the three remaining branches when one cylinder is exhausted. The rear axle, of the semi-floating type, is continued, but with the difference that the driveshafts have been made larger and the wheels are secured to the driveshaft by a new method. The differential gears are upset on the end of the shafts which makes the differential gears and driveshafts integral. A double set of brakes is carried on the



RAMBLER MOTOR BASE SUSPENSION; PULLMAN TORSION SUPPORT

rear axle, and the screw-and-nut type of steering gear is continued, the nut having been lengthened to increase the wearing surface. Model 53 is a five-passenger touring car, model 54 is of the same capacity, but it also may be fitted with a close-coupled body. Model 55 is a seven-passenger touring car or limousine. The only difference between 54 and 55 is in the wheelbases and tire sizes, and 53 differs from the others in the use of elliptic rear springs. The Rambler spare wheel is of course retained, but it has been improved by tapering the hub bolts attaching it, which makes the wheel more readily removed.

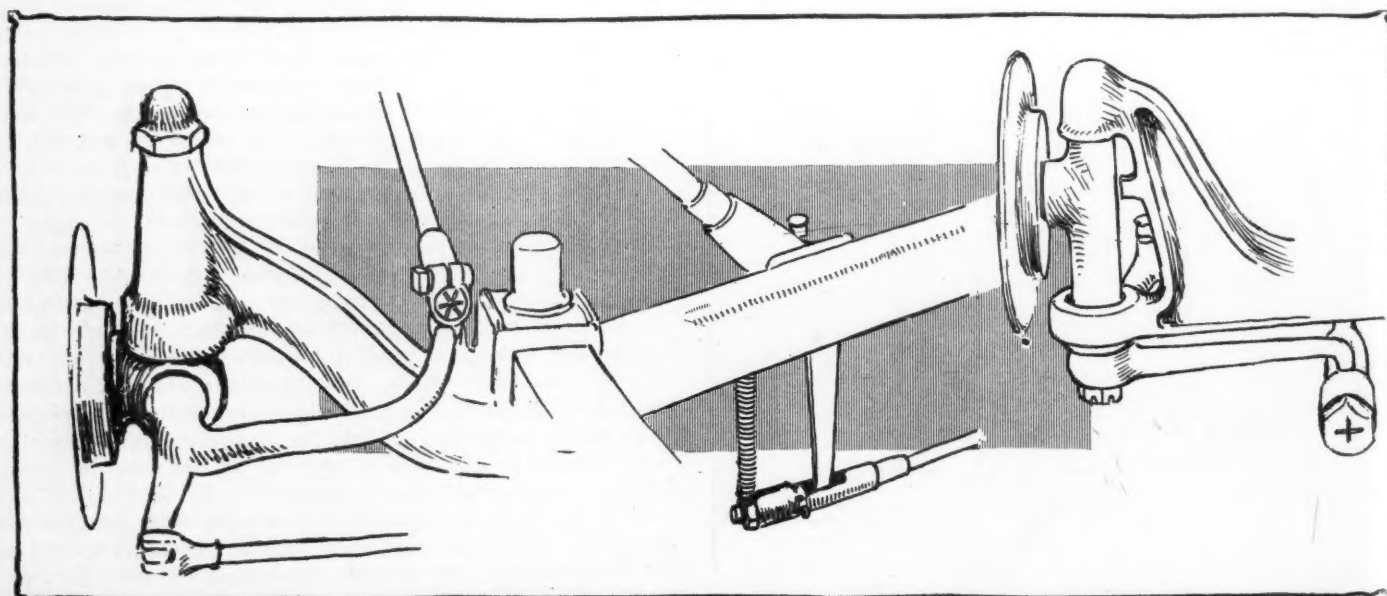
Inter-State—All the most important features of the 1909 Inter-State models have been retained in the 1910 models, except for a few necessary refinements of detail added to an increased wheelbase and larger cylinder bore, an improved type of clutch, a three-quarter elliptic rear spring suspension and more room in all styles of bodies. Nothing has been omitted which it was believed could give better results as to reliable running qualities, graceful appearance and economical upkeep, all features having been accepted universally as possessing exceptional merit. The bore of the cylinders is increased from $4\frac{1}{4}$ to $4\frac{1}{2}$ inches, which gives the motor an increase from 35 to 40 horsepower; the carburetor is larger and an imported U & H high-tension magneto is substituted. The full-elliptic rear springs previously used have been abandoned in favor of three-quarter elliptics, which are 45 inches long; the front springs have been increased in length and are now 42 inches long, and all are 2 inches wide. Instead of the thirty-two alternate steel and bronze disks employed in the clutch this year, an improved form of multiple-disk is now used, comprising sixty-three plates of tempered saw-blade steel running in a bath of oil in a separate compartment integral with the transmission case. The batteries and tools are now carried in one large box on the left runningboard instead of in separate boxes on opposite sides; the gears of the transmission are heavier and increased in width from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches; an oil-sight feed is fitted to the dash to show that the oil is properly circulating; oil cups are fitted to the spring shackles; the brakes have been increased in diameter, and the wheelbase has been lengthened from 112 to 118 inches. Aside from the changes above mentioned, the Inter-State cars still retain many interesting details; the water-pump case is cast integral with the crankcase, as are also the brackets for the oil pump and magneto, and the water and oil pumps and the magneto are all accessibly located on the left side and driven by the same gear. The crankcase is a high-grade aluminum casting, accurately machined by the use of various jigs, and the oil reservoir is bolted directly to the bottom of it. This is easily removed for adjustment or inspection of the camshaft, connection-rods or push-rod rollers. The lubrication is accomplished by the constant level splash system with a sight-



AMERICAN SIMPLEX, A TWO-CYCLE CAR

feed indicator on the dash. The level is maintained by a rotary-gear oil pump, which forces the oil from the sump of the crankcase through the indicator on the dash and back into the crank-chamber, from which it overflows into the sump or reservoir below, to be strained and again circulated. The side members of the frame are specially reinforced for some distance before and behind the dash, where the strain of the load is greatest, and the suspension of the power plant and transmission mechanisms has given much consideration. The motor is suspended by two legs behind to the side members of the frame, and in front it is attached through a single bolt to a cross-member, and the clutch and gearset are contained in a single compact housing, which is flexibly connected to a cross member of the frame in front and rigidly attached to the torsion tube behind.

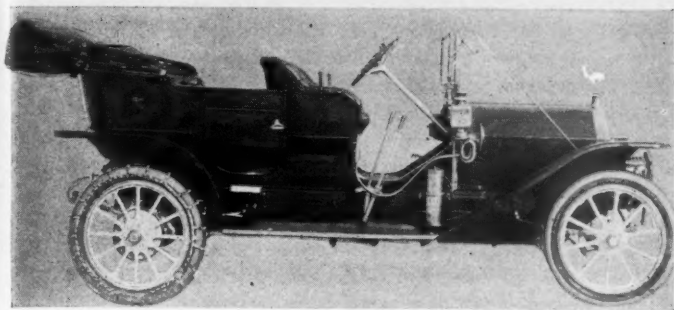
American Simplex—The Simplex Motor Car Co. has been since its inception a careful developer of the two-cycle design of car and today has a product which has demonstrated its reliability during the past season. The 1910 model is little different from that of the present season. A few of the leading characteristics of this two-cycle car are: Two-cycle four-cylinder motor with cylinders in pairs and combined selective gearset and rear axle. This motor is of the three-port type, the explosive mixture entering the crankcase through a third port. In the crankcase it is compressed by the piston. A particularly high compression is used in these cylinders, it registering 90 pounds per square inch. The pistons are provided with deflectors, the exact design of which was determined after considerable experimenting. The ports, of which there are four for the inlet and exhausts, are wide and about $1\frac{1}{4}$ inches in depth. The motor design is carefully studied out and there has apparently been no desire to simply produce a motor with fewer parts than in some other make of car. The apparent aim in this motor has been to produce a power plant of the utmost reliability. Its design incorporates a transverse shaft at the forward end, which drives the magneto



MITCHELL KNUCKLE DESIGN

RAMBLER SAFETY STEERING GEAR SPRING

PENNSYLVANIA STEERING KNUCKLE



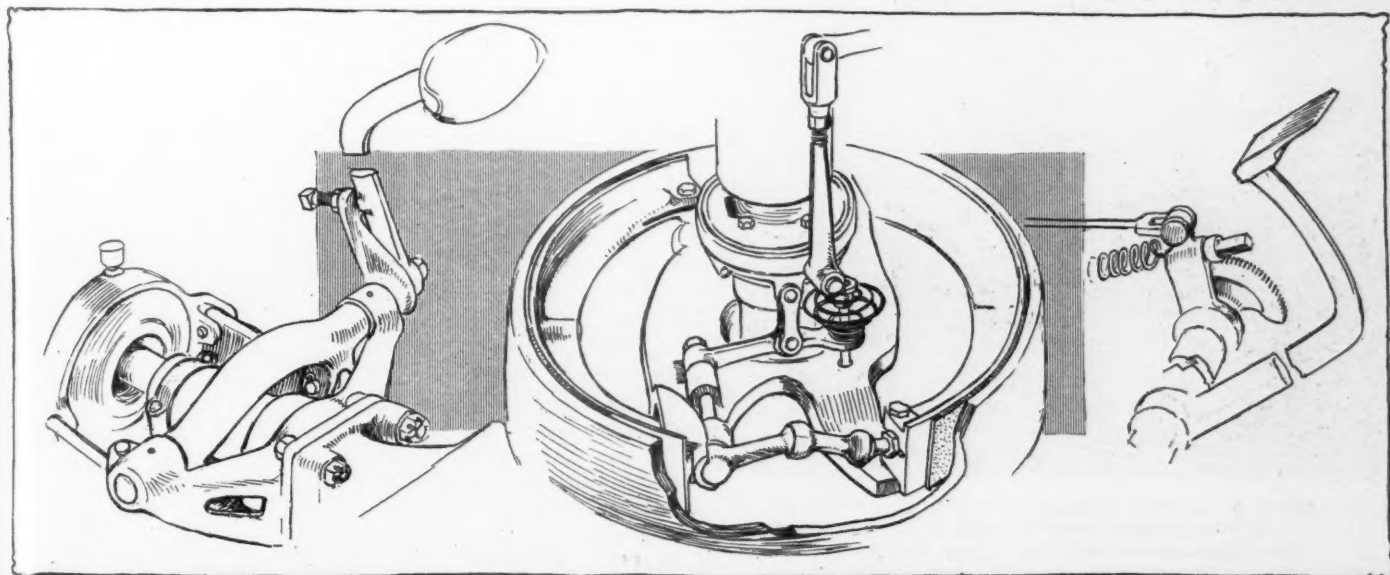
INTER-STATE IN ITS TOURING CAR FORM

through a bevel gear, the timer located on the top of the vertical shaft; the fan through a vertical shaft; the water pump. This shaft is carried on ball bearings with ball thrusts, and all gears are inclosed and their lubrication is well looked after. The rear axle is carried throughout on annular ball bearings, as is the gearset, which operates selectively and is located immediately in front of the expansion in the axle housing for the differential. The brakes are both internal, operating against drums of different diameters. The crankshaft used in the motor is made hollow to reduce weight and has the throws mounted at 90 degrees—that is, the offsets to cylinders one and two are at 180 degrees to each other, and the offset to cylinders three and four are in the same relation to each other. The crank throws one and two are then at 90 degrees to three and four. The clutch is of the multiple-disk type and the running gear throughout is a stout construction, with side members of the frame well proportioned to their work.

Marmon—Changes made in the Marmon for 1910 show refinements rather than any departure in construction, chief among these refinements being the lengthening of the wheelbase to 116 inches, and the improvement of the steering mechanism by having the cross tie rod protected by the front axle. A change in motor suspension also has been made, a separable cross arm being flanged to the motor and held in place by means of eight bolts, this arm extending across to the respective members of the chassis frame, and engaging a large diameter pin in the shackle, which is in turn riveted to the chassis frame. Cast aluminum plates also enter largely into the construction of the body. The Marmon motor, which has not been altered any, has four vertical cylinders, which are cast in pairs and which have 4½-inch bore and 5-inch stroke, giving 32-40 horsepower. The valves are placed on opposite sides. As before stated, the engine is supported within the main frame by a three-point support, the engine sloping rearward. The crankcase is of the barrel type, made from a one-piece aluminum casting with a separate alumi-

num oil reservoir bolted to the bottom. Bolts instead of studs are used to secure the bearings, cylinders, etc., while the crankshaft is removable through the rear of the case, the forward main bearings being a solid bushing while the center and rear are divided. The crankshaft is a single steel forging. Noticeable in this construction is that the intake manifold is cast in the cylinders and is waterjacketed, a system which requires only one pipe connection with the carburetor. A centrifugal water pump, a belt-driven fan and a cellular radiator comprise the cooling system, while a dual system of ignition is provided, using a Bosch high-tension magneto, a single Bosch coil on the dash, and a battery. The water pump and magneto are on the exhaust side of the motor, and are gear-driven, with the shaft extending through the pump. Automatic lubrication is employed, there being a gear-driven gear pump which draws oil through a screen and forces it to the three main bearings, where it enters the hollow crankshaft through radial holes which register with grooves in the bearings and is forced in the shaft into the connecting rod bearings and up the connecting rods through tubes into the piston pin bearings. For accessibility's sake the oil pump is placed outside of the crankcase in a separate housing and is driven from the crankshaft by spiral gears. There is a cone clutch, the male member of which is of cast aluminum, having an asbestos fabric facing with relieving springs under the fabric. The rear axle and transmission are a unit, there being a three-speed selective transmission contained in an aluminum bell-shaped gear box, which is placed to the forward side of the axle housing. A tube enclosing the drive shaft avoids the use of a set of radius rods or a torsion bar, the tube being brazed into a flanged end which bolts to the forward end of the gear box. The rear axle is of the floating type, while the front axle is of forged steel I-section and carried on ball-thrust bearings. The wheelbase is 116 inches, the tread 56½, the clearance 10 inches and 34-inch wheels are fitted. The Marmon comes as a touring car, roadster, coupe, limousine or landaulet.

American—The American cars for 1910 are now made in four body types—a five-passenger traveler, a two-passenger roadster, a seven-passenger tourist and limousine. All are built on the same chassis with the exception of 36 by 4-inch wheels in front and 36 by 5-inch wheels in the rear on the tourist and limousine, and 40 by 4-inch wheels all around on the traveler and roadster. The underslung frame, which has been a characteristic of the American cars since their inception, is still retained. Although no radical changes have been made in this chassis, there are a number of improvements which tend toward the general refinement of the product. The 50-horsepower motor with its L-type cylinders cast in pairs with a 5¾-inch bore and 5½-inch stroke is now fitted with a circulating lubrication system with the oil pump contained in the sump of the crankcase

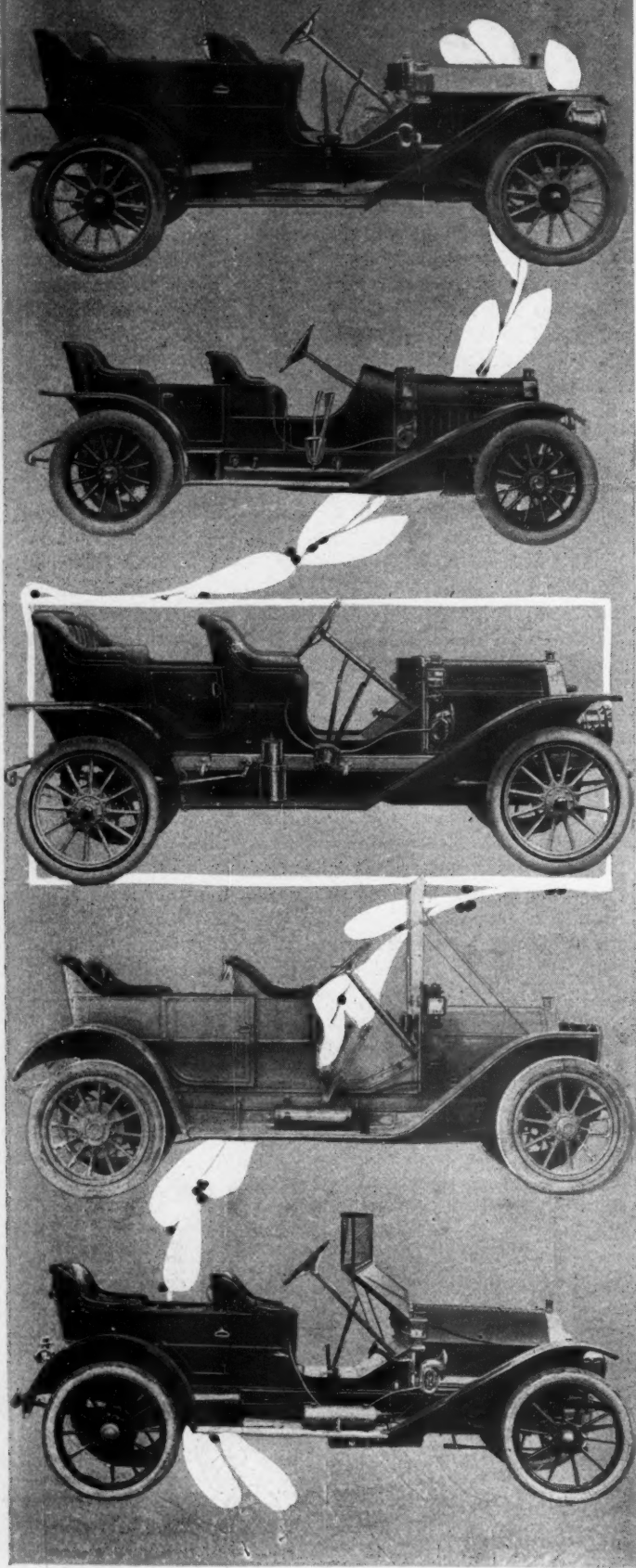


PREMIER CLUTCH ROCKER SUPPORT

RAMBLER EXPANDING CLUTCH

MARMON BRAKE ADJUSTMENT

Some Toy Tonneaux



PULLMAN MODEL K 10, FOUR-CYLINDER
ATLAS, A 60-HORSEPOWER, TWO-CYCLE CAR
NEW MODEL OF THE COLE 30
ONE OF THE LATEST MARMONS
GAETH, TYPE XXI, AS A TOURABOUT

and gear-driven off the camshaft. The double ignition system has given way to the dual type, with the elimination of the second set of spark plugs. An adjustable air pump is now fitted on the end of the camshaft to maintain pressure in the fuel tank. The filler cap of the gasoline tank is now provided with a long neck which extends out beyond the trunk rack, which makes it possible to conveniently replenish the fuel supply without disturbing the luggage. The intake pipe is now bolted direct to the cylinders, the ports being flanged and attached to studs in the cylinders. The shape of the radiator is changed, which alters the shape of the entire hood, and where this year the flat tube design has been used they are now using the honeycomb type. The fan belt is now of the V type instead of the flat, and the fan has a rim cast integral with the blades. The bearings throughout the whole car are now of the F & S annular ball type, changes in this respect having been made in the transmission, rear axle, wheels and fan. A torsion tube with a large ball-and-socket joint attached to the subframe and the rear end of the transmission now takes the drive off the springs and increases the riding qualities of the car. The rear axle is heavier in construction, and improvements have been made in the universal joints therein. The rear axle shafts are now forged integral with the clutch blocks, which grip the wheels, and both ends of the springs are shackled this year to obtain freer action. The steering gear is also heavier in construction throughout, and the outer column is now stationary. Extra heavy braces have been provided for the fenders and lamp brackets. The length of the sloping torpedo dash has been increased, and the sides of the body between the dash and the front seat are now closed in near the footboard.

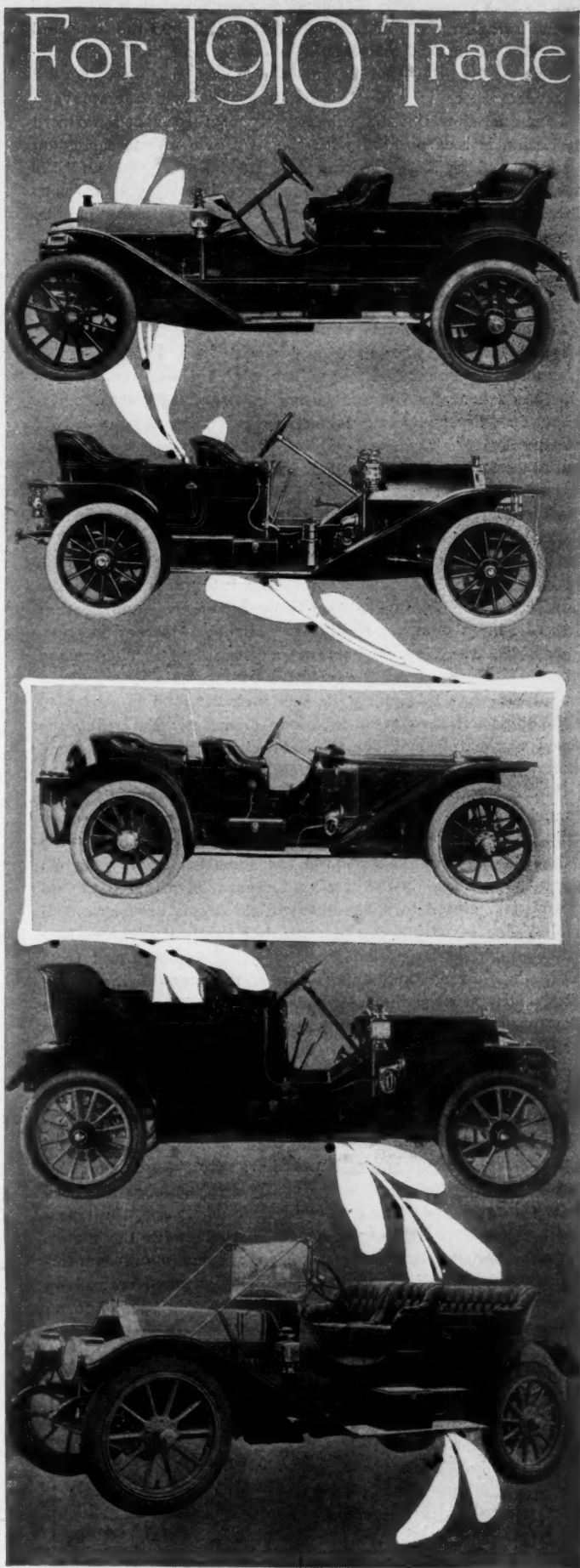
Gaeth—A touring car, tourabout, limousine and delivery wagon comprise the Gaeth line for the coming season, the features of which are the cooling system, ignition and clutch, those three points being Paul Gaeth's hobby. In the cooling system it is noted that he used the thermo-syphon system, and a honeycomb radiator, the water capacity of the system being 8 gallons. The Gaeth uses a low-tension make-and-break ignition system in which the Bosch magneto and batteries figure. The Gaeth clutch is of the contracting band type and is contained within the fly-wheel. This always has been a Gaeth feature. The axles are I-beam in front and floating in the rear, while the steering gear is of the nut-and-screw type. In detail, the touring car has a 40-45-horsepower motor with a 4 $\frac{7}{8}$ -inch bore and 5 $\frac{1}{4}$ -inch stroke, the four cylinders being cast in pairs. A force feed oiler is used in the lubrication scheme. The drive is by shaft and the transmission three speeds selective. The wheelbase is 120 inches and there are 36 by 4-inch tires in front and 36 by 4 $\frac{1}{2}$ in the rear. The car is of seven-passenger capacity. The tourabout is the same thing with the exception of carrying four passengers, and has the same size tires front and rear, 36 by 4. The Gaeth commercial wagon is fitted with a one-cylinder motor developing 12-15 horsepower and cooled by the thermo-syphon system. Planetary transmission is fitted, and the drive is by side chain. There are 34-inch wheels in front and 36 in the rear, while the wheelbase is 109 inches. Jump spark system ignition is used. The capacity of the machine is from 1,500 to 2,000 pounds and the regular body length is 73 inches, with a width of 44 inches and a height of 56 inches.

Moon—Heretofore the Moon Motor Car Co. has been satisfied to manufacture only one model, but for the coming season it has met the demand for a low-priced car, and because of this has turned out a running mate to the big Moon, a 30-horsepower car that aims to incorporate the latest ideas in the motor construction. The motor shows 30 horsepower and the engine is suspended without the use of a sub-frame. On the half-time shaft and pump, the gears are of the helical type, while the lubrication of the engine is effected by force feed. The bore is 4 $\frac{1}{2}$ inches and the stroke is 5 inches. The cooling system includes a positive pump and a fin tubular radiator. The valves are placed on opposite sides and mechanically operated, while the frame is pressed steel cold rolled, 4 inches deep, with a 3 $\frac{1}{2}$ -inch drop in the rear to allow for full elliptic springs. The frame of the Moon is strangled 3 inches to allow turning in a small space. The front

axle is I-beam and one-piece drop forged and heat-treated. The spring seats are 4-inches in width, and forged integral with the axle. The rear axle is semi-floating, the live shaft being 1¾ inches in diameter and with 3½ per cent nickel steel, while the axle tubing is 2½ inches in diameter and made of seamless steel. The rear axle and transmissions are integral, the transmissions, of the selective type, giving three speeds ahead. The brakes on the little Moon are large, being 12 inches in diameter and with a 2-inch face. The wheelbase is 110 inches, and the wheels themselves are 34 inches in diameter. The road clearance being 11½ inches under the front axle. Full elliptic springs are used in the rear, and semi-elliptic in the front. The big Moon now is rated at 45 horsepower, whereas in 1909 it stood at 30 horsepower, the motor having a bore and stroke of 4¾ and 5 inches respectively. The wheelbase has been increased 120 inches and the body is roomy enough for five or seven passengers. Thirty-six-inch wheels instead of 34 are now used, with 4-inch tires in front and 4½ in the rear. Some of the notable features of the big Moon are a honeycomb radiator, a Bosch magneto, four speeds ahead and reverse, selective type transmission, and multiple disk clutch.

Schacht—Formerly the Schacht Mfg. Co. made motor buggies, but now it has turned its attention to the low-wheeler and the result is one chassis which is used for a variety of purposes, being offered as a runabout, a four-passenger family car and a light delivery car. The last named carries an enclosed body and the machine has a load capacity of 800 pounds, the body measuring 65 inches from the front seat to the rear of the body. Taking up the motor, one finds an engine of the horizontal opposed type and having two cylinders, water-cooled, the cylinders being 5½ by 4½-inch and cast in one piece. The mechanically-operated valves are placed on the top of the motor. The cooling is thermosiphon. The lubrication is effected by means of a force-feed oiler with six feeds to the bearing surfaces. The clutch is cone and the transmission planetary, the drive being by chain to the rear wheels. A feature of the Schacht is the clearance, there being 17 inches or more. The wheelbase is 103 inches and the weight of the car 1,400 pounds. The bearings are Parson's white brass throughout the motor, with large Timkens in the wheels and on the jackshaft. The wheels come 32 by 3½-inch with pneumatics and 36 by 1½-inch with solids. The body on the pleasure car is convertible from a two-passenger to a four or to a delivery wagon.

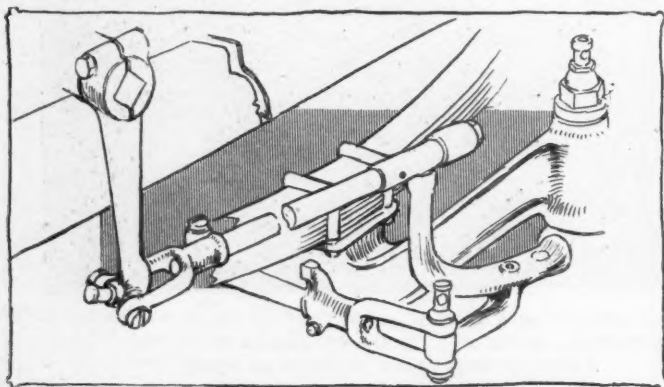
Pennsylvania—While the Pennsylvania Auto Motor Co. is not an advocate of bringing out yearly models, still it has something new to offer for 1910 in the way of a unit-axle-transmission, for which it claims strength and rigidity are secured by the hemispherical type of differential housing which is intended to defeat deflection and insure a pitch alignment between the bevel gears. The transmission housing is integral with the differential housing and fitted with large annular bearings, while the forward end of the squared shaft has a special cage of roller bearings which brings about constant parallel alignment between the transmission shaft and utilizes the entire face of the transmission gears. This idea is claimed to greatly simplify gear-shifting and is one of the features of the present-day Pennsylvania. The Pennsylvania motor carries its valves in cages, the valves being operated by individual rocker arms while the cages are surrounded by water and held to a taper seat by means of a single nut so that both cage and valves may be removed with the unit which inclosed the entire combustion chamber. The crankshaft is hollow and rotates in die-cast bushings. Rocker arms, valves and cages are interchangeable, and the combustion chamber is hemispherical. The lubricating system is the same as before, the oil being discharged from a mechanically-driven lubricator under 90 pounds pressure to the three main engine bearings and then projected outwardly through the throws and picked up by an eccentric ring which has a projection which enters into the hollow crank-throw, thus lubricating the lower connecting rod ends. Then it is projected outwardly by means of glands in the connecting rod bushings and thrown up into the cylinders and pistons. There are four Pennsylvania models—the D 25 showing an A. L. A. M.



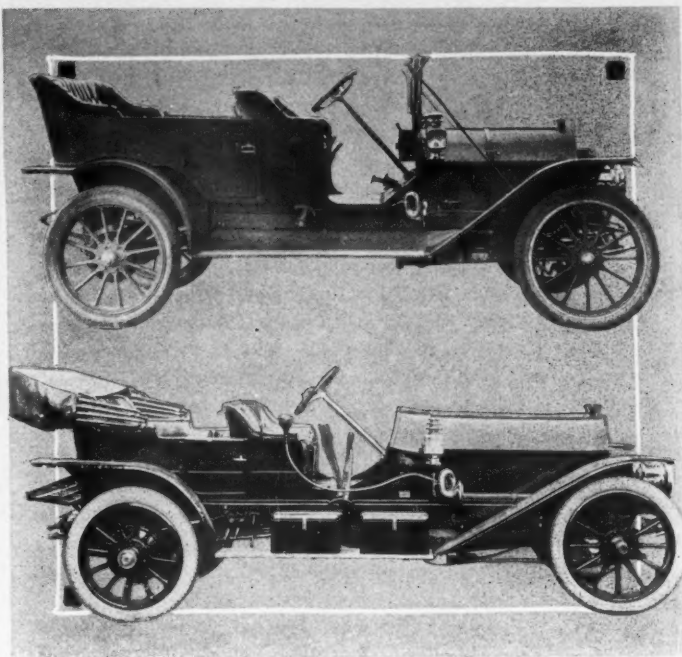
THE BIG MOON WITH A BABY TONNEAU
SPEEDWELL, MODEL 10 C, A TASTY CREATION
AMERICAN MODEL WITH UNDERSLUNG FRAME
MORA LIGHT FOUR IN ITS NEW DRESS
GLIDE AS A DEMI-TONNEAU ROADSTER

rating of 28.9 horsepower, a C-50 of 36-horsepower, a B-50 of the same rating and an F-6 of 54 horsepower. In D-25 the bore and stroke are $4\frac{1}{4}$, in C-50 and B-50 $4\frac{1}{4}$ by $5\frac{1}{4}$, and in F-6, the six-cylinder, $4\frac{3}{4}$ by $5\frac{1}{4}$. All cylinders are cast in pairs. On all four models there is a dual ignition system which employs a Bosch magneto, while the selective type; three-speed forward transmission is incorporated with the rear axle in one casing on B-50, C-50 and F-6. The wheelbases run 110, 114, 122 and 129 inches respectively. On the D-25 the clutch is a leather-face cone with ball thrust and cork inserts, while on the other it is a cork inserted cone with ball thrust.

Jackson—As in the case of the Rambler the Jackson people have discontinued their two-cylinder models and the three offered for 1910 are of the four-cylinder type, model 30 having a 4-inch bore and stroke and 105-inch wheelbase, model 40 a $4\frac{1}{2}$ -inch square motor and 110-inch wheelbase, and model 50 a $4\frac{3}{4}$ -inch motor and the wheelbase extended to 122 inches. The small car is a new one in the Jackson family, and its unit power plant has the cylinders cast in pairs and the gearbox is a unit with the lower half of the crankcase. The overhead camshaft is driven by a chain with the casing, differing in this respect from the other two models in which latter the camshaft is driven by a vertical shaft at the front of the motor, which shaft takes its drive from the crankshaft through bevel gears and transmits through similar gears to the camshaft. Noticeable in the small car motor is the upper half of the crankcase which is an integral unit with the cylinder casting. Coming to the valve action, it is noted that the intake and exhaust are mounted at about 45 degrees on opposite sides with the idea of attaining a hemispherical combustion chamber, which also permits of the use of large-diameter valves. In the 30 they are $1\frac{7}{8}$ inch with a $\frac{3}{8}$ -inch lift, and in model 40 with the same lift they are 2 inches in diameter. Following the advocacy of the four-cylinder the Jackson company has retained its thermo-syphon cooling system with which is used a fan which is of the die-formed type with six blades set at an angle to give maximum efficiency. It is driven by a flat belt from the magneto-shaft in the two larger models and from the camshaft in the small one. All three Jacksons use the same lubricating system in which the flywheel is the motive force for circulating the oil and which is inclosed in a chamber which also is used as an oil reservoir. The idea is that the revolving flywheel picks up the oil which is caught by a shelf in the top of the cage and from there dips into a receptacle on the side of the case flowing into a pocket, from which the rear crankshaft bearing is supplied. The overflow goes into another receptacle beneath the four cylinders and as the rotation of the connecting rod splashes the oil into a groove on the side of the crankcase the flow is carried into the third-cylinder compartment. From here it is similarly conducted by grooves into the other compartments and above each crankshaft is a pocket which fills with the splash. When the oil reaches a predetermined height it overflows into the reservoir and returns to the flywheel housing. Multiple-disk clutches are used in the two larger models and a cone in the small one, the transmission and clutch on all three forming a unit with the motor. The transmission is three-speed selective, the main and countershafts being mounted in the same vertical plane and carried on ball bearings. On all three models shaft-drive is used, but on



PREMIER STEERING GEAR CONNECTIONS AND DESIGNS



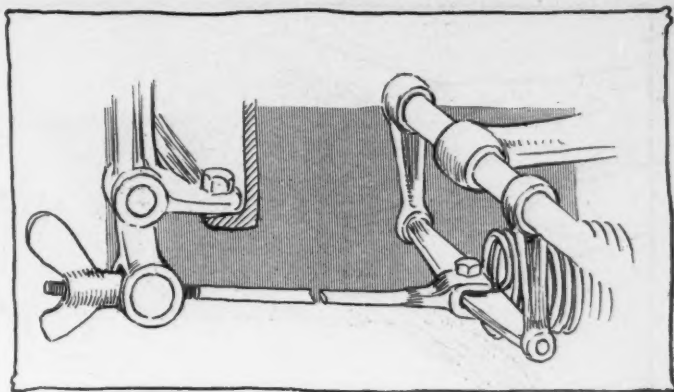
NEW JACKSON FITTED WITH TOURING CAR BODY
PENNSYLVANIA FOR 1910, WITH A TOY TONNEAU

model 40 there is a propellershaft which has three universals and a torsion bar paralleling it. On the other two a single universal joint is used, and a torsion tube is fitted instead of a separate torsion bar. In the way of ignition the Jackson uses the Splitdorf magneto as well as the coil and battery system.

Mitchell—Novel in the three 1910 models of the Mitchell is the fact that the same cylinder castings are used on all three of the models instead of three sizes, as was the case in 1909. This innovation makes the Mitchell company one of the pioneers in this practice, and the use of the system is a great aid in the manufacture of the cars for the reason that there is no changing shop and resetting of machines from the time the manufacture the output of the season starts upon it is completed. This universal system of manufacture has resulted in three models in which few differences are to be noted. An expert can detect a difference in spring suspension, frame size, and several other details, but on the whole the chassis are similar. The bore and stroke of the Mitchell motor is $4\frac{1}{4}$ by 5 inches, and the cars come in a runabout with 100-inch wheelbase, a five-passenger touring car with 112-inch wheelbase, both of them with four-cylinder motors, and a six-cylinder capable of carrying seven people and having a wheelbase of 130 inches. The two fours have a formula rating of 28.9 horsepower, and the six jumps to 43.3. Although having adopted the practice of casting the cylinders in pairs instead of singly as heretofore, the Mitchell company has not changed the general design, the exhaust valves still being located in the cylinder heads and operated by rocker arms, and the intakes are in offset chambers on the right side, where they are operated direct by lifter rods from the camshaft, one camshaft opening both intakes and exhausts. The valve chambers are completely waterjacketed and there is a vertical passage in the casting through which the rocker arm and one of the exhaust valves passes. Instead of a five-bearing crankshaft as used heretofore, there is a three-bearing crankshaft used on the four-cylinder types. The crankshaft is a heat-treated forging with an integral flange to which the flywheel is bolted. There is a departure noted in the crankcase, the upper half supporting the crankshaft bearings being an aluminum casting. The lower portion is cast iron, the idea being that the cast iron of the cylinder castings above and the lower half of the crankshaft beneath materially stiffen the aluminum half of the crankcase between them. With the idea of reducing noise two changes in the valve actuation have been made, one of them being the introduction of rollers in the ends of the valve-rocker arms and rollers also have been substituted on the lower end of the valve-lifter rods. A Lavigne oiler is a new

thing in the lubricating system, being located directly on the crankcase at the right front and belt-driven from the crankshaft. Two of the six leads go to the four cylinders—one branching to each twin casting, two connecting with the end bearings of the crankshaft, another going to the clutch, and the sixth to the crankcase. Splash lubrication is used. In the cooling department it is noted that the fan is mounted on the front cylinder casting by means of a bronze bracket into which the fan spindles thread. The Mitchell radiator, too, is new in that an entirely new design with vertical sides is employed. Also, a centrifugal water pump has replaced the gear type. The transmission now is a unit with the rear axle so that there are but two units in the car, the other one being the motor with cone clutch incorporated in the flywheel. In the gearset an improvement has been made in the employment of a double race of cup-and-cone bearings for the mainshaft. Hyatt rollers still are used for the counter or layshaft. The bevel gear differential replaces the spur type of differential heretofore used. The use of stamping is becoming a feature of these cars.

Firestone-Columbus—Whereas the Columbus Buggy Co.'s line of gasoline cars in 1909 consisted of a five-passenger touring car and runabout, the 1910 offering is a five-passenger car, four-passenger runabout and roadster, limousines and landaulets. The roadster is featured by a left-hand control and a body of unique lines. A glance at the motor does not show many changes in appearance, but the oil pump now is of the positive plunger type instead of rotary, and a sight has been placed on the dash for the purpose of observing the oil supply. As the oil is returned from the sight it is distributed to the two compartments of the crankcase, one for the forward and the other for the rear end of the motor, splash being depended upon to distribute the lubricant. A feature of the connecting rods is the laminated liners by which it is possible for a beginner to make adjustments without trouble. Another improvement is found in the locking devices used on the connecting rod bolts. There also is a slight change in the combustion chambers. In the transmission there is a spline shaft with four splines made of case-hardened steel, which permit of a freer shifting of gears than heretofore. The forward driving pinion is mounted on two ball bearings instead of one. The countershaft also is mounted on ball bearings, giving in all three sets of ball bearings in the transmission. The use of the leather-faced cone clutch is retained, but now it is possible to remove the clutch or adjust the springs without removing anything other than the floor boards. There is a new form of uni-

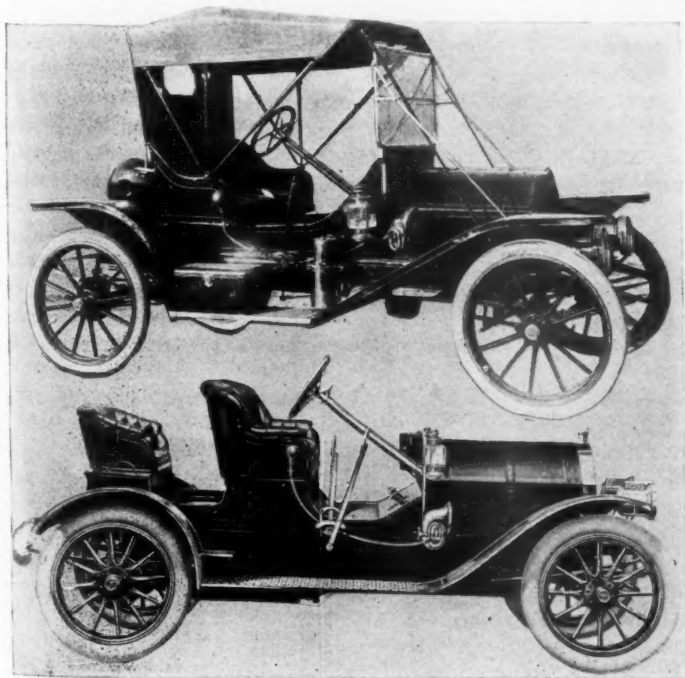


BRAKE ADJUSTMENT USED ON RAMBLER

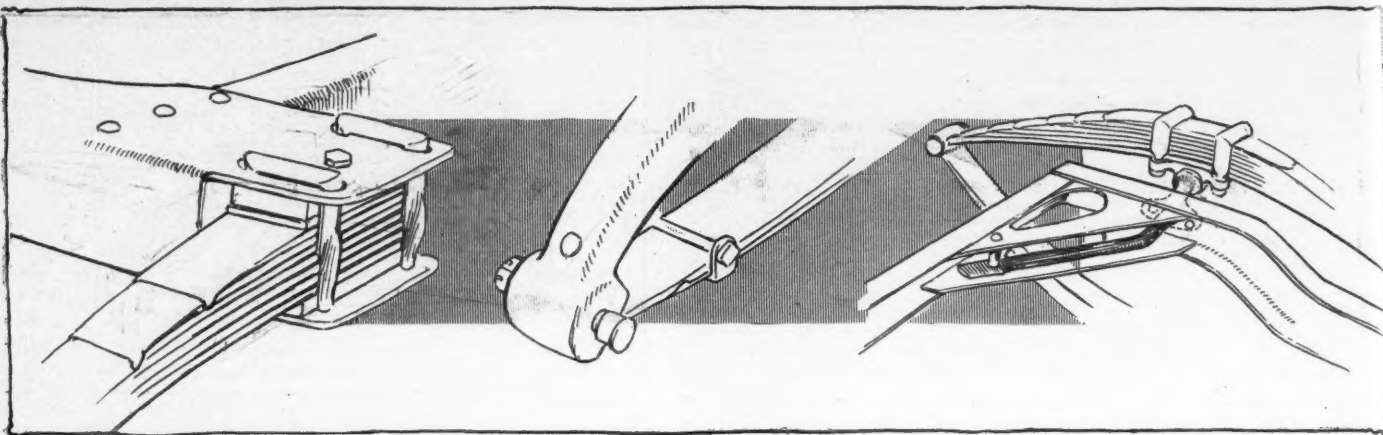
versal joint between the clutch and the transmission which works out of oil, while the operating pedals work direct instead of compound. The worm-and-sector form of steering gear is retained. On the front axle there is an improvement in the steering knuckle which is classed as a cross between a reversed Elliot and Lemoine, which permits the center of the wheel to come close to the steering pivot, which is intended to decrease the strain at this point. The axle centers, spindles and steering arms are made of vanadium steel, while New Departure ball bearings are used in the rear. In the rear axle the axle center or housing is made of pressed vanadium steel, and extends from wheel to wheel in one piece. The wheels are mounted on New Departure ball bearings. The axle being of the usual floating type, drives ahead by means of four-finger dogs secured to the axle shaft, which shaft may be removed without disturbing the wheels by taking off the hub caps. The removable rear cap on the housing permits of the withdrawal of the entire gearing.

Demotcar—When it came to naming its product the Demotcar Sales Co. showed its patriotism by working Detroit into the title, De standing for the Wolverine metropolis and mot for motor. Thus armed the car has gone out on the 1910 market in roadster form only, being equipped with a two-cylinder motor which shows 10 horsepower. The cylinders are of the L type with a bore of 3½ inches and a stroke of 3½, the valves being located in the head and cast singly. The lubrication is splash, which is fed by gravity and the cooling is had by means of a thermo-syphon system. The source of current supply in the ignition system is a magneto of the low-tension type, while the transmission system includes shaft-drive through a torsion rod, the rear axle being of the semi-floating type. There are two crankshaft bearings of the annular ball type; two plain bearings on the camshaft, while in the gearset there also are annular bearings. The wheelbase of the Demotcar is 80 inches and the wheels are 30 by 2½. A multiple-disk clutch is fitted and there is a sliding change-gearset. Both sets of springs are semi-elliptic, the front axle is a steel forging and internal expansion brakes are used.

Everitt—The product of the Metzger Motor Car Co., called the Everitt after the designer, is one of the newcomers and contains several unique features, not the least of which is the 30-horsepower motor, which is featured by having cast in one piece the cylinders, upper half of the crankcase, the upper half of the crankshaft bearing bed, the inner half of the gear housing, and the intake and exhaust manifold. The motor is suspended from two drop-forged steel cross rods made in I-beam section. The crankshaft is of the three-bearing type and suspended from the upper half of the crankcase, the crankshaft being a drop forging with a 2¾-inch throw. The secondary motor casting comprises the waterjacket cover, the water outlet pipe and the fan support. The bore is 4 inches and the stroke 4¾. The camshaft is a drop forging 1½ inches in diameter, and with the cams forged integral. All the valves are located on the left-hand side of the motor, while on the same side are the water pump and magneto, which are on the same shaft and driven by one gear. The pump is of the centrifugal type. The carburetor is located on the right-hand side of the motor, the inlet pipe leading between the cylinders to the intake manifold. The auxiliary oil reservoir is on the

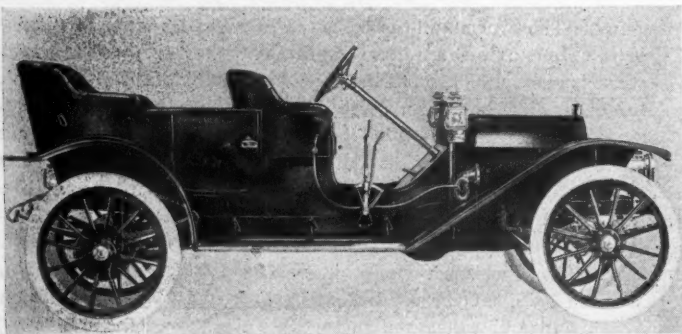


AIR-COOLED CAMERON AS A ROADSTER
ONE OF THE MITCHELL FAMILY—MODEL R



STODDARD-DAYTON REAR SPRING HANGER AND SPRING OILER

MARMION'S REAR SPRING HANGER



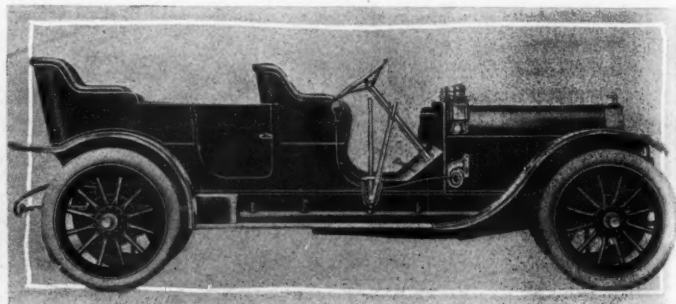
ONE OF THE NEW ONES—THE EVERITT 30

right hand side of the motor, there also being an auxiliary reservoir of the vacuum type which keeps a constant oil level to the lower half of the crankcase, which is of aluminum and so constructed that it is possible to remove the lower half of the crankcase without disturbing the crankshaft or cylinders. There are two sources of ignition, one through the magneto and one through the battery, while the radiator is of the vertical tube type. The cone clutch is aluminum, faced with 2-inch chrome tan leather. The steering gear, of the worm and sector type, has its steering knuckles protected by the front axle. The wheelbase is 110 inches and the wheels carry 34 by 3½-inch tires. The front springs are semi-elliptic, and the rear full-elliptic. The body offering is a five-passenger, showing 52 inches in extreme breadth across the inside of the rear seat. The rear fenders follow the rear wheels to the back of the body, where they break off horizontally, while the front fenders follow the front wheels to opposite the front extremity of the frame.

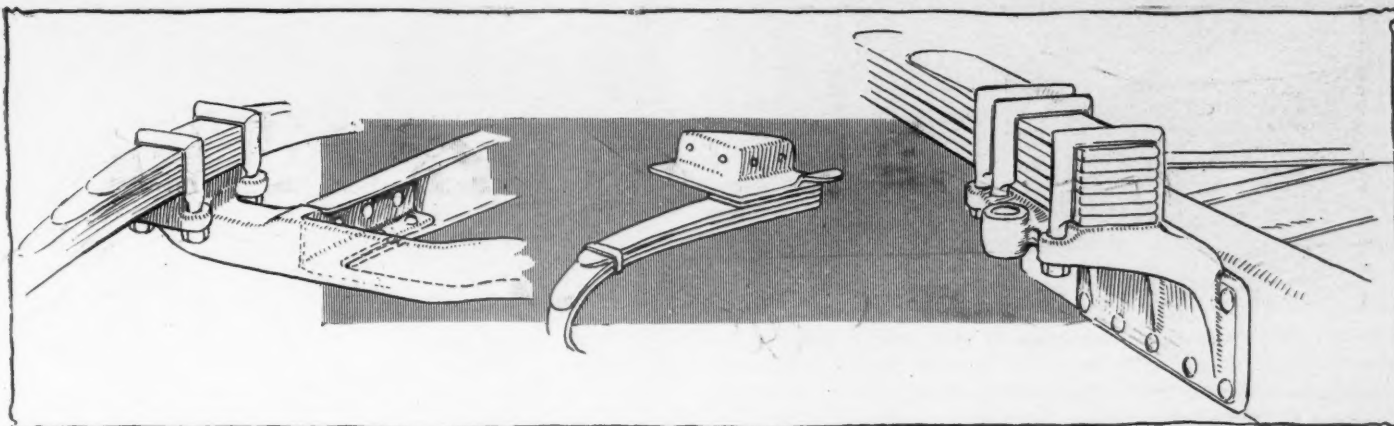
Klinekar—Besides being interested in the realm of the commercial car, the B. C. K. Co. offers a line of pleasure cars for the consideration of the motoring public, 1910 marking the introduction of this concern to the manufacturing world. In the pleasure-car line the Kline people offer two chassis, one of which is a six-cylinder whose motor uses the bolted en bloc system with a bearing between each cylinder. The valves have nickel steel heads with carbon steel stems and are placed on opposite sides of the cylinders and are interchangeable. The motor is mounted on a three-point suspension by two arms integral at the front end and resting on a I-beam cross bar at the rear. Two separate systems of ignition are furnished—Bosch magneto and battery—and with a plain coil on the dash. The six comes as a touring car and also as a limousine, landaulet, toy tonneau and runabout, while as a special there is the Meteor, a two-passenger speed car which differs only from the regular six in that it has a larger steering wheel, an extra auxiliary oil reservoir of 4-gallon capacity with a hand-operated pump; a 26-gallon gasoline tank which is located in the rear of the driver's seat; semi-elliptic rear springs and a wheelbase of 108 inches. The regular six has a wheelbase of 122 inches. The other chassis is a four-cylinder of 24-30-horsepower and offered as a touring car and limousine. Its vertical cylinders are cast separately and also has a bearing

between each cylinder. In other respects it greatly resembles the six except that the wheelbase is 109 inches. The Kline oiling device consists of a reservoir at the bottom of the crankcase which is of the force feed type and automatically operated on the splash system. There is a cone clutch, and the front axle is of the single-beam I section type and the rear semi-floating.

Sterling—The output of the Elkhart Motor Co. for 1910 will comprise some six separate styles, including a touring car for five passengers, known as model O-3; a toy tonneau, model O-2, using the same chassis, and model O-1, a roadster. These cars will differ from previous models in that the wheelbase has been changed from 115 to 118 inches; a more powerful motor of Sterling make with a 4-inch bore and a 5-inch stroke is used in place of the L-type engine formerly employed; the clutch is of Sterling design, and the gearset, rear axle, frame and, in fact, the entire car is of heavier construction and larger proportions. The motor is of the four-cylinder type, placed so that the radiator is over the front axle; the cylinders are cast separately with large integral waterjackets, spherical domes, intake valves on the right side and exhaust valves in the heads, operated respectively through push-rods and rocker arms, which are actuated by means of integral cams on a single camshaft within the crankcase, on the right side, and driven by means of an enclosed gear, which meshes with a pinion on the crankshaft. The clutch, located in the flywheel, comprises an extension 10 inches in diameter, machined and ground, and two accurately ground rings, side by side, and expanded by means of a toggle motion, which are pressed at the will of the operator against the inner periphery of the ring. There is an entire absence of any facings, and the chances of wear are reduced to a minimum. The toggle motion affords high surface pressures, and the clutch, although it is soft of engagement, is sure, with slipping eliminated, excepting at the will of the driver; which, under certain conditions, is a positive advantage. Drive from the clutch to the rear axle is by means of a shaft within a tube, on the end of which is a ball-and-socket universal joint, and between it and the bulge of the semi-floating rear axle the gearbox is suspended. New Departure ball bearings are fitted throughout the gearset, while adjustable ball thrust and Hyatt roller bearings are used in the rear axle. The differential gears are of the bevel type and the



ATLAS OFFERING IN THE SIX-CYLINDER LINE



MOLINS ELLIPTIC REAR

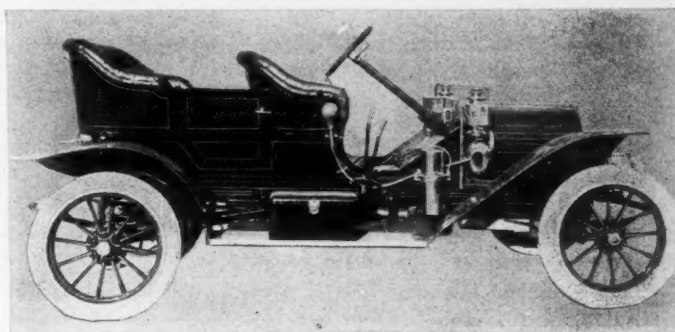
AUSTIN SPRING ATTACHMENT

ATTACHMENT PREMIER THREE-QUARTER REAR SPRINGS

case is provided with openings at four places to facilitate lubrication. The springs are of special grades of steel, 38 by 2-inch front, while the rear springs are of the three-quarter platform type with 42 by 2-inch side members and 34 by 2-inch cross member in the rear. This company also makes a model O-4, 7-passenger touring car, which is almost identical with the other models, except that the bore and stroke of the motor is increased by $\frac{1}{2}$ inch and the wheels have 35 by 4-inch tires.

Atlas—Continuing to be an advocate of the two-cycle principle, the Atlas Motor Car Co. has made a radical departure for next year in the reviving of a four-cylinder motor. A couple of seasons back the Atlas company had a four, but side-tracked it in favor of the three-cylinder of comparatively small power. During the past summer the company brought out a 60-horsepower four-cylinder, still retaining the two-cycle principle, which was tried out with great success in the last Vanderbilt cup race. This performance decided the company to offer for 1910 a 60-horsepower touring car and a toy tonneau. The new Atlas four-cylinder engine is square, 5 by 5 inches, whereas in previous years the cylinder size has been 4 by $4\frac{1}{2}$. In the 1910 cars the full floating type of rear axle equipped with Timken adjustable taper roller bearings is used. On the touring car the wheelbase will be 128 inches and 120 inches on the toy tonneau. Although the company is making these two cars its leaders, it intends to continue the manufacture of the 20-horsepower two-cylinder taxicab, and the 30-horsepower three-cylinder touring car, each with cylinders $4\frac{1}{2}$ by $4\frac{1}{2}$, in which no changes have been made. On all the Atlas models the oiling system will consist of a mechanical force feed oiler, gear-driven from the end of the engine shaft, the oiler pumps feeding direct to the cylinders and engine bearings.

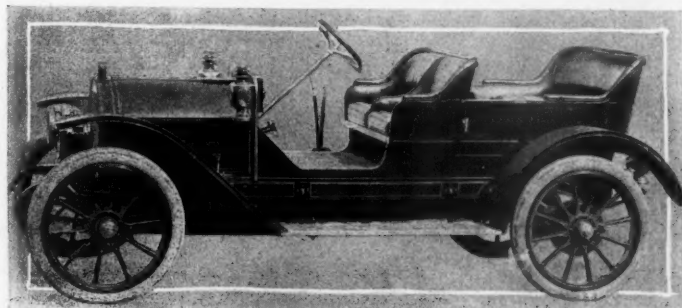
Cameron—Not only has the Cameron Car Co. put forth a line of four-cylinder runabouts and touring cars, but it also has turned its attention to a six-cylinder, which is featured by its light weight, which is claimed to be only 1,700 pounds. The motor, with its bore and stroke of $3\frac{3}{8}$ and $3\frac{1}{2}$ inches, develops 36 horsepower, and has such conventionalities as the Splitdorf high-tension magneto, gear pump, constant level oiling system, a self-contained clutch, an engine base of aluminum and split horizontally in the center, separately-cast cylinders and the Cameron patented valve arrangement. High clearance is another feature



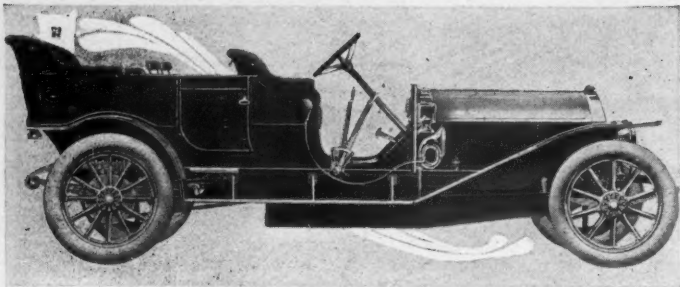
ONE OF THE CAMERONS, THE MODEL 10

of the six-cylinder, while the wheelbase is 114 inches, the car carrying 34 by $3\frac{1}{2}$ -inch tires all around. While the six-cylinder comes mostly as a touring car, the Cameron company also offers it as a runabout with a low-hung offset frame and a large gasoline tank in the rear, the motor being hung well back of the front axle. Another feature on the runabout is that the front wheels are 2 inches smaller than the rear, the tire sizes being 34 by $3\frac{1}{2}$ and 32 by 3. In order to accommodate the six cylinders there has been a slight change in the Cameron transmission system, power being delivered to the rear wheels through spur gears. In the four-cylinder line the Cameron people have a runabout and a touring car showing 24 horsepower, in which the bore is $3\frac{3}{8}$ inches and the stroke $3\frac{3}{8}$ inches.

National—The National line for 1910 comprises three chassis models equipped with a four-cylinder 40-horsepower, a six-cylinder 50-horsepower and a six-cylinder 60-horsepower motor. Each will be fitted with either touring, baby tonneau or roadster bodies, and a special racing body will be fitted to the six-cylinder 60-horsepower chassis, which will be known as the speedway model. Both the six-cylinder models will remain practically unchanged, but many changes are to be found in the four-cylinder chassis. The wheelbase has been changed from 117 to 124 inches. The wheels have been increased in size to 36 by 4 inches and, in fact, there has been a general increase in the size of the entire car. The bore and stroke of the motor, which previously was $4\frac{1}{4}$ inches square, is now 5 by $5\frac{1}{4}$ inches, which increases the horsepower from 35 to 40. The ball-bearing crankshaft, which is still retained in the two six-cylinder models, has given way to plain bearings of Parsons bronze in this one. Both the cooling and the ignition systems remain unchanged, except that the radiator is larger, the magneto has been shifted to a bracket cast integral with the opposite side of the crankcase and driven from the same gear as the fan and the water pump. The cylinders of the motor are now ribbed below the jackets to increase their strength and, although the motor has been increased in size, it has been perceptibly shortened through an ingenious arrangement of its supports. The flywheel has also been slightly changed, being beveled on one edge to facilitate assembly, and the sump of the crankcase has been remodeled so that the partition, which



RECENT ADDITION TO MOON FAMILY—THE 30

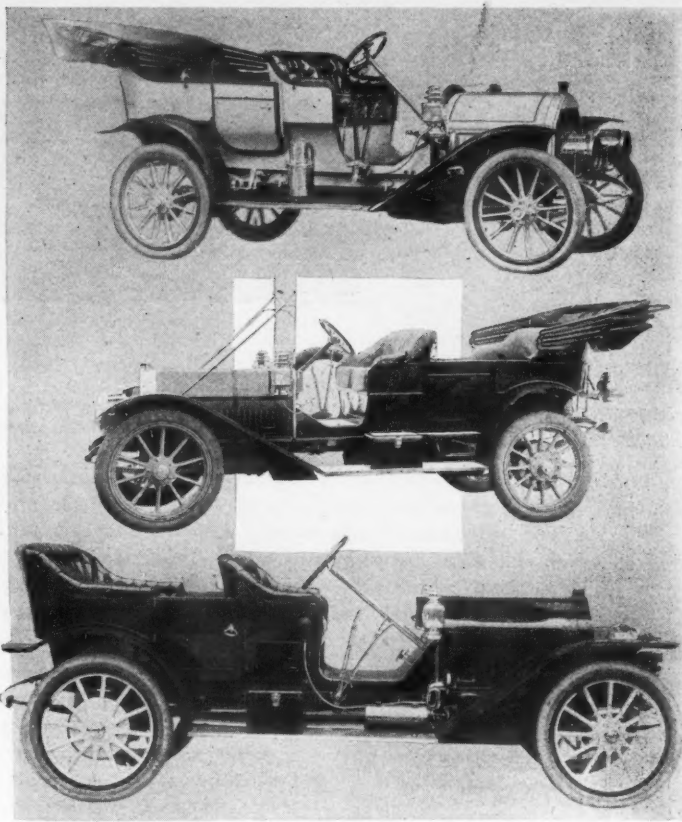


PREMIER SEVEN-PASSENGER SIX-CYLINDER MODEL

separates the sump from the crankcase proper, is now removable instead of being cast integral. The shifting arms of the transmission are now placed within the case and the shafts are mounted on Hess-Bright bearings. A steel case replaces the iron housing of the rear axle, and Timken bearings are employed. The springs this year are all a trifle longer, and the platform type in the rear have been replaced by three-quarter elliptics. The frame is provided throughout the entire length of its side members with a steel reinforcement, and in addition to the gusset plate additional channel steel braces are inserted at the corners of the rear end. The steering rod has been raised above the front axle this year and more rake has been given to the steering column, while the back of the toy tonneau is removable, so that it may be converted into a roadster type.

Lion—Numbered among Detroit's recruits is the Lion Motor Car Co., which is bringing out the Lion 40, which has a power plant of the unit system in which the crank and transmission cases are rigidly bolted together and with hand holes for easy admission to either motor or transmission, the unit being suspended by means of integrally-cast brackets, which rest on cross members of the frame. The motor itself is a four-cylinder four-cycle with a bore of $4\frac{1}{2}$ inches and a 5-inch stroke, while the cylinders are cast in pairs with integral waterjackets and valve pockets. The connecting rods are drop-forged steel in I-beam section, the piston bearing being solid and of phosphor bronze. The crankshaft is carried on three bearings in the crankcase and is drop forged, with an integral flange for retaining the flywheel. In the way of valves those useful devices are drop forged, with their heads integral, the intakes being in pockets on the side of the cylinder, while the exhaust cages are retained in the head of the cylinder. Splash lubrication is used, there being a gear pump contained in the tank, which is part of the crankcase. A dual system of ignition, including a magneto, is used. The cooling includes a honeycomb radiator, the circulation being maintained by means of a centrifugal pump, which is driven from the magneto shaft. The transmission is a selective sliding and the clutch is of the inverted cone type, Thermoid-leather faced. Going to the running gear, one finds a pressed-steel dropped frame made of channel section and braced with cross members and gusset plates; semi-elliptic springs in front and three-quarter elliptics in the rear; a one-piece beam front axle and a semi-floating rear, which has Hyatt roller radial and thrust bearings, while there is only one universal joint between the rear axle and transmission. The steering gear is of the worm-and-sector type with a 17-inch steering wheel; the wheelbase is 112 inches and the tread $56\frac{1}{2}$ inches, while the wheels are 36 by $3\frac{1}{2}$ -inch. The Lion comes in two forms—one a runabout with a large deck at the rear, on which can be placed a single or double rumble, and a touring car of four or five-passenger capacity, the four-passenger being of the close-coupled type.

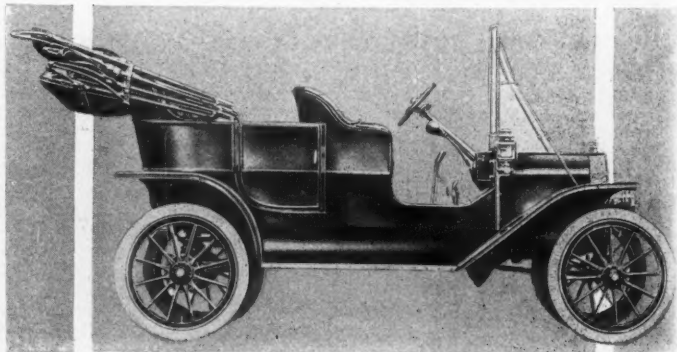
Pierce-Racine—The offering of the Pierce Motor Co. follows the conventional and aims to avoid freak construction. Probably the most startling change is found in the bodies, which are of the straight-line idea, and far different from anything heretofore brought out by this Racine concern. Mechanically, improvements have been made in the transmission, rear axle and oiling system. As now offered the lubrication of all moving parts is effected by the splash system, while the multiple disk clutch, com-



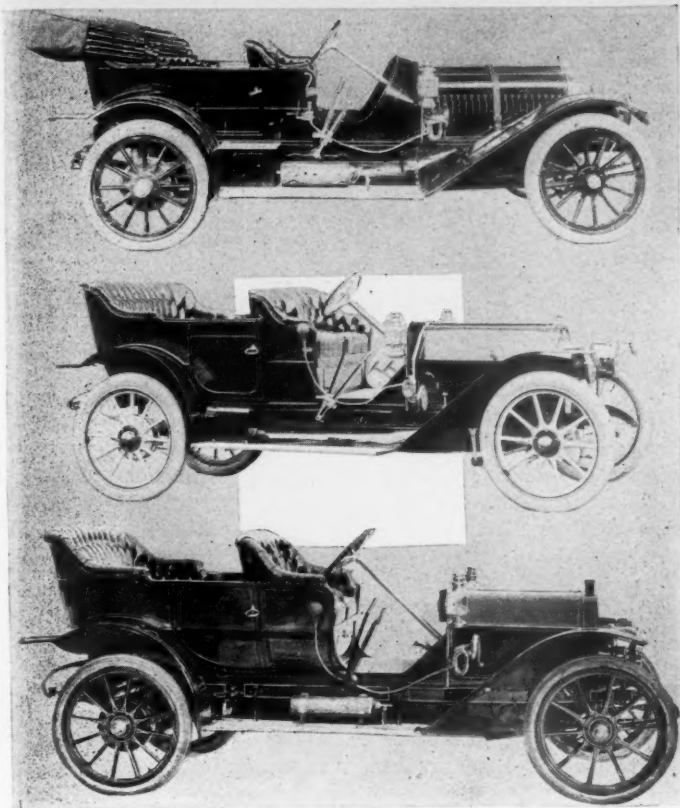
REGAL, MODEL F, WITH A TOURING BODY
GLIDE OF THE SEVEN-PASSENGER VARIETY
NATIONAL 40, A FIVE-PASSENGER MACHINE

posed of thirty-nine saw-steel disks running in oil, is used for the first time. One of the specific features of the Pierce is found in the rear springs, where an auxiliary coil is fitted at the extreme end, which is designed to prevent the swaying from side to side over a rough road at high speed and which makes an easy riding car.

Ford—Henry Ford is one of those manufacturers who believes that motor car styles should not change with the seasons and that if anything good and new is brought out it should be incorporated into the car without regard to the time of the year. Therefore, the Ford as it is seen in the Palace is not radically different from the model displayed a year ago. The same Ford car-marks are to be noted—the flywheel magneto, the left-hand system of control, the vanadium steel construction, and the light weight of which Ford makes much capital. Although making but the one chassis, the Ford has a variety of bodies, including a five-passenger touring car, a roadster with a detachable rear seat, a four-passenger tourabout, with the rear seat detachable, a coupe, a landaulet, and a town car. Ford's ignition scheme is interesting in that he uses a low-tension magneto generator, the magneto having no commutator or brushes, no gearing, no contact points, no moving contacts or no moving wires. The rotating member is a part of the flywheel and the stator, which carries the



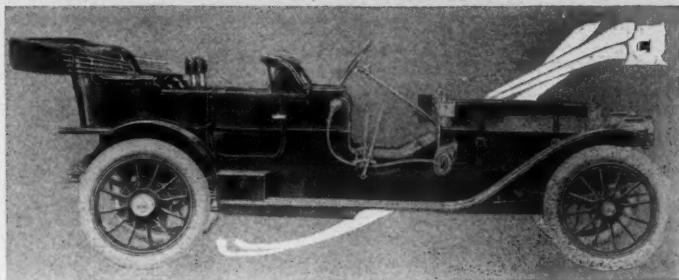
FORD MODEL T TOURING CAR AS IT NOW APPEARS



STANDARD SIX, A ST. LOUIS PRODUCT
KLINE SIX-CYLINDER, A NEWCOMER
LITTLE MOON, WITH ITS TOURING BODY

coils in which the current is generated, is a stationary spider which is permanently attached to the engine, the whole being carried in the flywheel casing. Because of this combination, ignition is had as long as the engine runs because of the fact that the slightest movement of the flywheel generates current enough for a good spark. In detail, the model T Ford is a four-cylinder four-cycle 20-horsepower car with a $3\frac{3}{4}$ -inch bore and a 4-inch stroke, the cylinders being cast in one block with the waterjackets and the upper half of the crankcase integral, the waterjacketed cylinder heads being detachable. Thermo-syphon cooling is furnished and the clutch is a multiple disk. The transmission is the Ford spur planetary. The wheelbase is 100 inches. The lubrication scheme is a combination of splash and gravity. Final drive is by cardanshaft with a single universal joint to bevel-drive gears in the live axle.

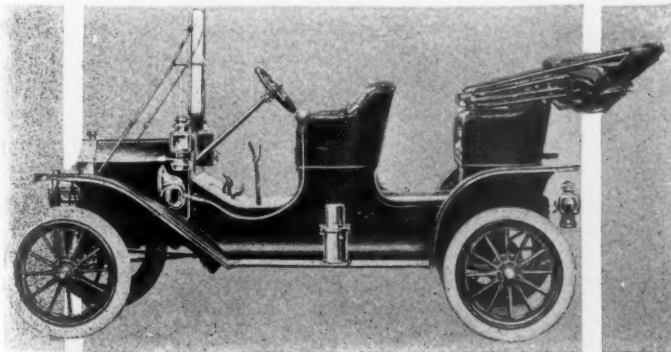
Standard Six—Pinning its faith exclusively to the six-cylinder, the St. Louis Motor Car Co. offers the Standard, the outcome of the American Mors, but an entirely new car throughout. In putting out this car, the concern has followed the conventional all the way through and has produced a machine which follows the lines generally adopted by American designers. The six-cylinder motor has its cylinders cast in pairs, the bore being $4\frac{1}{2}$ and the stroke 5 inches. This engine is of the valve-in-the-head type, the valves being contained in cages so that they may be easily



ANOTHER ONE OF THE MITCHELLS, THE BIG ONE

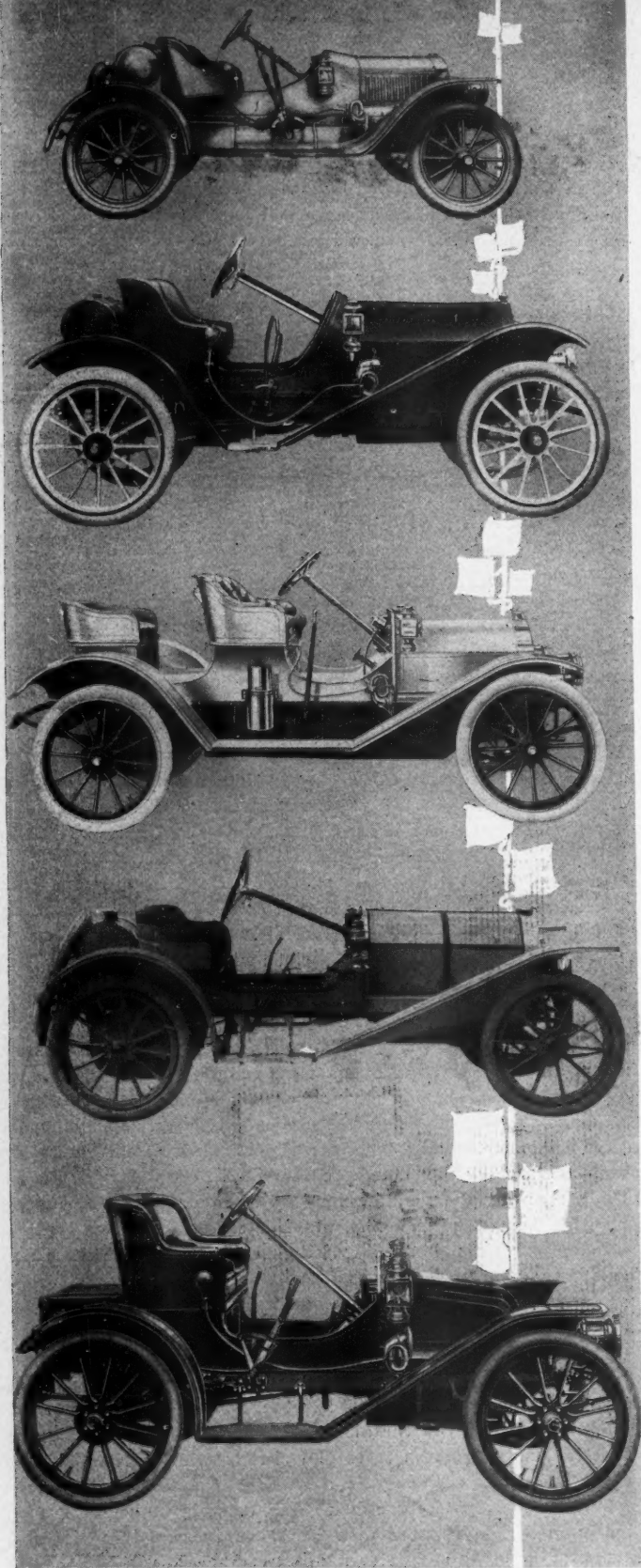
removed for the purpose of inspection or grinding. The operation of the valves is secured by means of adjustable pushrods and rocker arms from the single camshaft enclosed within the crankcase of the motor, the pushrod mechanism on their crankcase end being held in place of a yoke for each pair. Flat-head type pistons with three eccentric compression rings, an oil groove near the bottom and the piston pin anchored in the piston, are used. Special steel drop forgings of I-beam section are used for the connecting rods, there being plain bronze bushings in the wristpin end, and split nickle babbitt bearings at the crankpin end. The crankshaft, made of alloy steel, is a one-piece drop forging with the flywheel flange integral. Other features of the Standard six are three-point suspension, a Carter carburetor, Remy magneto, and a centrifugal pump. The lubrication scheme employed is a circulating system, the circulation being maintained by a gear pump located on the forward end of the camshaft and attached to the cross-member which supports the front end of the motor. Prominent in the cooling system are a vertical tube radiator, a four-bladed, belt-driven fan, and a centrifugal pump. The dual system of ignition is furnished, being of the jump spark type with the current supplied by a Remy magneto and dry cells. The induction coil is of the single non-vibrating type, and a push button is provided for starting on compression. The Carter carburetor, of the venturi-tube float-feed type, has an auxiliary air valve which can be controlled from the dash. In addition a hot-waterjacket is provided to aid in the vaporization of the mixture. The inverted cone type clutch is faced with leather and has cork inserts to insure easy engagement. This clutch runs on a roller bearing on a spindle formed by the end of the crankshaft, and a ball-thrust bearing is used in the clutch collar. Other details are a sliding gear selective type transmission, giving three speeds forward, and Hess-Bright ball bearings which are used throughout.

Cartercar—Broadening out their lines, the Cartercar people have turned out two distinct chassis for 1910, whereas heretofore they have confined themselves to one. As several styles of bodies are offered they have a most complete line for the new season. In bringing out the new chassis the Cartercar designer has made the cars larger and secured more power, and is offering a five-passenger touring car and a runabout with interchangeable bodies. Probably the most noted change in the Cartercar design is getting away from the engine of two-cylinder type and using one with four. The model H, which is the roadster, has its four cylinders cast in pairs, the cylinders being 4 inches square and the motor rated at 25 horsepower. The motor is placed low in the car and because of this it is possible to use the thermo-syphon system of cooling, the Cartercar having unusually large pipes leading to and from the radiator. Unique is the new transmission driver with which the Cartercars are equipped, it consisting of two flat pieces of steel bolted to the flywheel and the opposite end to a cross arm on the disk shaft. As the wheel revolves it exerts a straight pull on these plates, thus rotating the disk, and at the same time allowing for a free and easy and forward and backward movement of the disk shaft, engaging it with the friction wheel. The friction disk has been increased in size and consequently gives a greater number of speeds. As before, this friction disk is engaged to the rim of the friction wheel with a fiber facing, the fiber wheel being moved from right to left by means of single lever. Also noticeable is that the filler on the wheel is made in several sections, joining at different intervals



FORD FITTED WITH FOUR-PASSENGER BODY

Some 1910 Runabouts



MAXWELL MODEL Q OF THE SPORTSMAN'S TYPE
 PAIGE-DETROIT, NEW ON THE MARKET FOR 1910
 CARTERCAR, ONE OF THE ADVOCATES OF FRICTION DRIVE
 EMPIRE 20, WITH ITS COMPACT LITTLE MOTOR
 MORA 20, A RUNABOUT EASILY HANDLED

around the circumference so that by loosening a few bolts the filler can be changed without removing the wheel from the car. The Cartercar's chain-and-oil drive is retained. The friction transmission, the chain-and-oil drive, and the transmission driver are all covered by Cartercar patents. As showing the range in bodies the model H has a plain deck on the rear on which may be placed a box, a single rumble seat, a double rumble seat, a double surrey seat or a miniature tonneau. The model L, the touring car, has had the wheelbase increased from 102 to 110 inches, while the four-cylinder motor has a bore and stroke of $4\frac{1}{2}$ by $4\frac{1}{2}$ inches, which gives a rating of 35 horsepower. The car carries 34 by 4 inch tires. Both models are equipped with dual ignition embodying a low-tension direct-driven magneto as part of the regular equipment. The model L chassis also can be equipped with a taxicab body.

Paige-Detroit—Among the numerous new cars which are making their bow to the public in the palace the Paige-Detroit is out of the ordinary because of its motor, which is of the two-cycle, three-cylinder valveless type, the advantages of which are said to be that it has half the number of cylinders and 100 fewer working parts than a six of the four-cycle type, a comparison with which is brought about by the claim that the Paige-Detroit engine gives the same continuous driving power as the one with twice the number of cylinders. In a nut shell, the Paige motor has only three working parts—piston, connecting rod and camshaft. The engine is vertically-mounted under the hood and shows 25 horsepower with its cylinders having a $3\frac{3}{4}$ -inch bore and 4-inch stroke. The motor and transmission are built as a unit with three-point suspension, and the transmission is of the semi-selective gear type giving two forward speeds. The clutch is a leather-faced cone, and oiling is had by means of an automatic forced feed oiler which reaches all bearings and parts of the motor. Thermo-syphon cooling is used and the designer depends entirely upon the magneto for his ignition. Internal expanding and external contracting brakes work on the rear wheels which carry tires 32 by 3 inches. The Paige-Detroit comes only with a roadster body and has a wheelbase of 90 inches. The gasoline tank is cylindrical and is carried back of the seats, which are of two-passenger capacity. Easy riding is secured by means of a pair of semi-elliptic springs in front, and in the rear the support is had by means of a transverse 2-inch elliptic spring, which is supported on a front bracket from the differential housing, which housing is in turn reinforced by two heavy truss rods. The body is unique in that it is of pressed steel construction and enameled baked the same as the gasoline tank, hood and fenders.

Moline—There are two Moline chassis which carry with them a variety of bodies and among the changes noted is an increase in the length of the wheelbase, 3 inches having been added. The engine also is larger, the bore and stroke having been increased to 4 and $4\frac{1}{2}$ to $3\frac{3}{4}$ and $4\frac{1}{2}$. The magneto now is part of the regular equipment. There is a longer hood and the car sets lower because of the several refinements. Also new are the compound clutch levers, while the semi-floating rear axle has been improved. In front a heavier drop forged axle is used. In general the other Moline details are the same—shaft drive, semi-elliptic springs in the front and full elliptic in the rear, mechanical lubricator, pressed steel frame, 34 by $3\frac{1}{2}$ -inch wheels and a selective type of transmission. The clearance is 10 inches and the weight of the car is given at 2,000 pounds.

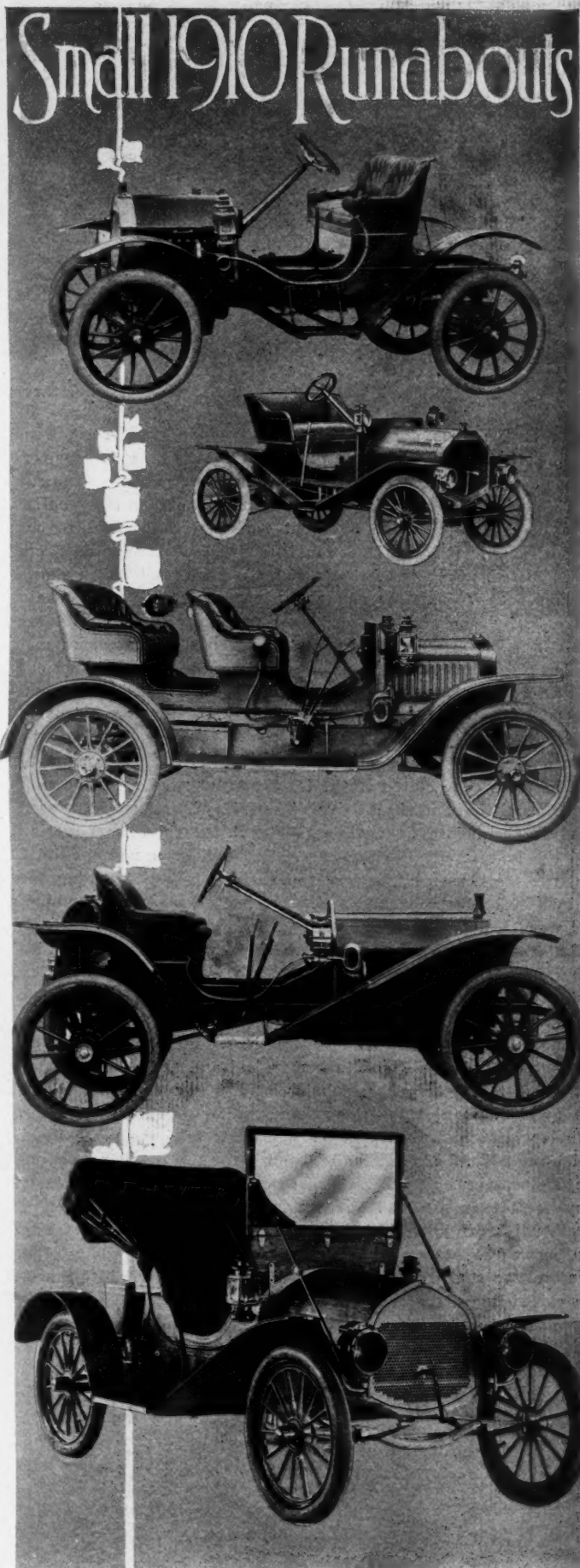
Glide—One of the veterans is the Glide, which has been on the market for many years and which comes for 1910 with few alterations. No radical changes were found necessary in the mechanical features, the Glide designer devoting most of his energy to refining his product. A touring car, four-passenger roadster and a four-passenger Scout car are the offerings for the coming season. The touring car has a 45-horsepower motor with separately-cast cylinders and a self-contained oiling system, while the ignition scheme utilizes an Eisemann high-tension magneto. The wheelbase is 128 inches and 36 by $4\frac{1}{2}$ -inch tires are carried front and rear. The body design has been refined, the result being a roomier tonneau. The roadster follows the same general lines

with the exception that it is equipped with four-passenger demitonneau body with three-quarter elliptic springs in the rear and 36 by 4-inch tires. Where the Scout differs from the roadster is that it has a wheelbase of 122 inches and is equipped with 40 by 4-inch tires front and rear. Using a drop frame lowers the bodies and also gives a straight-line drive. The Glide uses a multiple disk clutch which has thirteen large disks, 13 and 11 inches in diameter alternately, and running in an oil bath within the fly-wheel. Only one universal joint is used and that runs in oil in a dust-proof housing. The propeller shaft also is housed and the transmission and differential are made dust-proof and oil-tight. The Glide springs are made from vanadium steel with babbit bushings and grease cups are used to lubricate them.

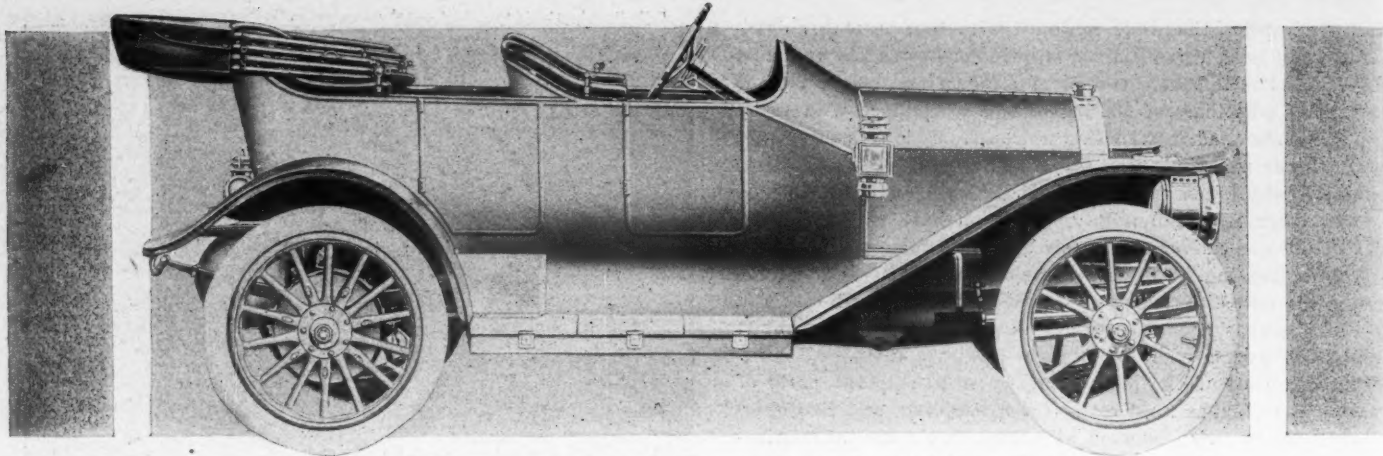
Metz—The plan of the Metz company is to ship the parts of its car to the purchaser all ready for assembling, and this offering has a two-cylinder opposed air-cooled motor and is friction-driven. It shows 12-horsepower with a 3½-inch bore and a 3½-inch stroke. The timing gears are enclosed and lubrication is had by gravity feed. The axles are tubular, with ball bearings both front and rear, while wire wheels are furnished, which are removable at the hub. A Bosch high-tension magneto makes up the ignition scheme, while the body consists of a skeleton frame and metal panels, with double bucket seats. The wheelbase is 81 inches and the tread 48, while the car complete weighs but 650 pounds. Full elliptic springs are used front and rear.

Brush—Few cars have entered on their third season carrying so many of their original novelty features. Of course it must not be forgotten that the pump carbureter scheme has been dropped, but the single-cylinder, vertical motor with its balanced crankshaft, the wood axles, the spiral springs working in conjunction with shock absorbers, the wood frame, the side-chain drive, the novel type of planetary gearset and the characteristic type of ball bearings remains a tribute to the inventive genius of the man who designed and brought to completion the initial chassis. For 1910 there are six different body styles instead of one, and they range in price from the little runabout model to the coupé. The wheelbase this year is 6 inches longer, it now being 80 inches. The power of the motor has been increased from 7 to 10 horsepower by lengthening the stroke from 4½ to 5 inches, enlarging the explosion chamber and adding a muffler cutout. Planetary transmission, which differs from many of this type in that it is completely housed in a single case and runs in oil, has also been improved by changing the single-disk clutches to those of the multiple-disk type, and the transmission lever is now made selective. The radiator is now of the Mercedes type, the edges of the body are bound with brass, the steering wheel webs are nickled and the entire finish of the car is better, all contributing toward a marked improvement in the general efficiency and appearance of the product.

McIntyre—The W. H. McIntyre Co. makes both motor buggies, pleasure cars and commercial vehicles. The pleasure car line consists of a two-passenger runabout, a four-passenger runabout and a five-passenger touring car. The touring car has a motor with its four cylinders cast in pairs and of the T-head type, the bore being 4¼ inches and the stroke 5½, giving a rating of 40 horsepower. Splash lubrication is employed, and a double ignition system is fitted. The transmission is selective sliding, and the clutch is an inverted cone, leather-faced and with cork inserts. The wheelbase is 115 inches and the tires are 37 by 4. In a smaller powered line there are a two-passenger runabout and five-passenger touring car. Here the motor is of the valve-in-the-head type, four cylinders, and with a bore of 4½ inches and a stroke of 3¾ inches, giving 30 horsepower. The wheelbase is 112 inches and the wheels 36. In the motor buggy line there are two models, one of them a runabout and the other a surrey. The former has a two-cylinder offset motor, 4½ by 3¾ inches and developing 14 horsepower. The wheelbase is 69½ inches, the drive side chain, and the transmission planetary. The motor is air-cooled and the steering is by wheel. The surrey differs from this in that it has a larger motor, the rating of which is 20 horsepower, and the wheelbase 95 inches instead of 69½. The McIntyre commercial proposition carries a closed body and has a



BRUSH AS IT LOOKS FOR NEXT YEAR
MCINTYRE OFFERING FOR COMING SEASON
MAXWELL Q CARRYING FOUR PASSENGERS
HUPMOBILE, RAKISH RUNABOUT FROM DETROIT
METZ, ONE OF THE AIR-COOLING BRIGADE



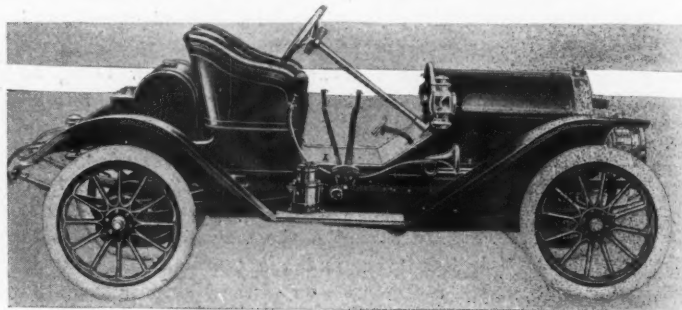
STODDARD-DAYTON FOR 1910, FITTED WITH NEAT-LOOKING TORPEDO BODY

motor of the removable unit type, a two-cylinder opposed, with 5 $\frac{3}{8}$ -inch bore and 4 $\frac{1}{4}$ -inch stroke, and showing 24 horsepower. It has a planetary gearset. The wheelbase is 95 inches. The car has 34-inch wheels and the drive is by means of two side chains. Also in the two-cylinder line, but made up as a pleasure car proposition, is a low-priced runabout, with a two-cylinder opposed motor, which is carried under the hood, and which shows 20 horsepower. This car also uses planetary transmission, chain drive, 30 by 3-inch wheels, and has a wheelbase of 90 inches.

McCue—The McCue hails from the far east, Connecticut, and while there is but one chassis, the car is offered as a touring car and a torpedo model, the former being known as model XXX and the latter as 6-X. The motor is a four-cylinder and rated at 40 horsepower, and having a self-contained oiling system of the splash type, double system of ignition including Bosch magneto and battery; cone clutch of the leather-faced type, selective sliding transmission and shaft drive. The frame is cold rolled pressed steel of channel section, while the front axle is I-beam section and the rear of the floating type. The springs are semi-elliptic and the wheelbase 123 inches, the entire equipment calling for 36 by 4-inch tires front and rear. The body is made of aluminum and wood.

Empire—Entirely new is the Empire which is making its debut this winter. Its general outline shows a four-cylinder motor with a bore and stroke of 3 $\frac{1}{2}$ and 4 inches which gives a 19.6-horsepower rating, the cylinders being formed in one casting and with valves on opposite sides. Incorporated in this casting on the left is the intake manifold and the exhaust manifold is on the right. The cylinder head is cast separately from the cylinder itself, and there is no water joint between the cylinder head and the cylinders. A point of importance upon which the makers of the Empire dwell is the rigid construction of the motor, transmission and rear axle, the motor clutchcase, propeller tubing, gearbox and jackshaft being a unit without a single universal joint in it. The motor is bolted to the frame and forms the center support of the cross-member, and at the rear are two supports on the frame through the jackshaft tubes. A straight-line drive is secured from the engine to the gearset. Large valves are used in the motor, being 1 $\frac{3}{4}$ -inches in diameter which makes the area of each valve one-quarter of that of the

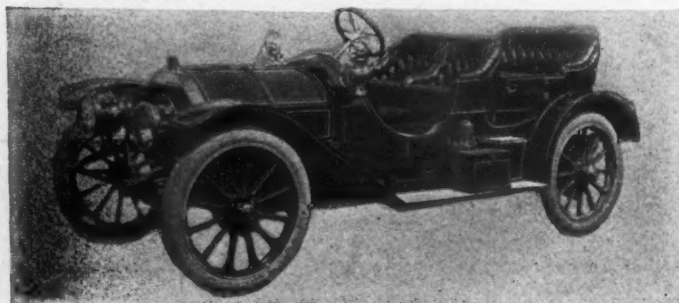
piston. Threaded valve stems and a hardened blind nut and lock nut serve as the adjustment between the valve stem and lifters. Splash lubrication is used and the supply of oil is replenished from an auxiliary tank by means of a hand pump. This splash is increased through the connecting rods caps having an eye plate 2 $\frac{1}{2}$ inches in length formed integrally with them, the blade dipping into the oil level in the case. The Empire has a cone clutch with an aluminum web with a composition facing. The clutch spring is inclosed and a ball thrust-bearing is used in connection with the spring. A two-speed selective gearset is used, direct drive being had through bevel gears. Chains of the roller type furnish the means of imparting the power of the motor to the road wheels, adjustment being had through pressed steel and clamping rings which fit over ball joints in the transmission arms, and an eccentric throw of $\frac{3}{4}$ inch allows of loosening



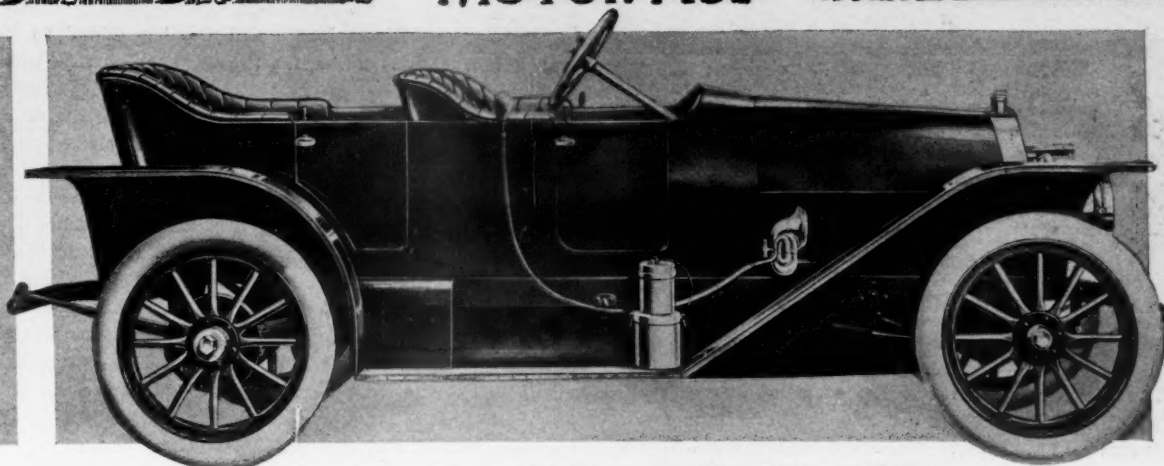
COURIER, ONE OF THE RECRUITS FOR 1910

or tightening the chains. The wheels are 32 by 3 $\frac{1}{2}$, and two models are offered—one of them a standard runabout with a rumble seat, and the other a two-passenger car with a cylindrical gasoline tank back of the seat.

Maxwell—Nine models are listed by Maxwell for 1910, one of the features of the line being the model Q, a four-cylinder proposition, which is brought out at a popular price, and which comes as a roadster with a rumble seat, a combination roadster and touring car and a touring car. In general detail this model Q has a 22-horsepower motor with a 3 $\frac{3}{4}$ -inch bore and a 4-inch stroke, double ignition system, sliding gear transmission, 93-inch wheelbase and 30-inch wheels. The Maxwell Sportsman in this line is for two passengers only and its racy appearance is added to by the placing of a cylindrical gasoline tank back of the seats. Besides the Q, the Maxwell people also have a four-cylinder, 30-horsepower car, which comes as a touring car, a roadster and a runabout. This big car has a bore and stroke of 4 $\frac{1}{4}$ inches square, double ignition system, sliding gear transmission, 110-inch wheelbase and 34-inch wheels. The two-cylinder field has not been abandoned, the Maxwell people continuing to list a 12-horsepower runabout with a 4-inch square motor, double ignition system, planetary gear, 82-inch wheelbase and 28-inch wheel. Most of the Maxwell talking points have been retained, principal of which is the unit construction, in which the engine



COATES-GOSHEN, AN ATTRACTIVE-LOOKING TOY TONNEAU



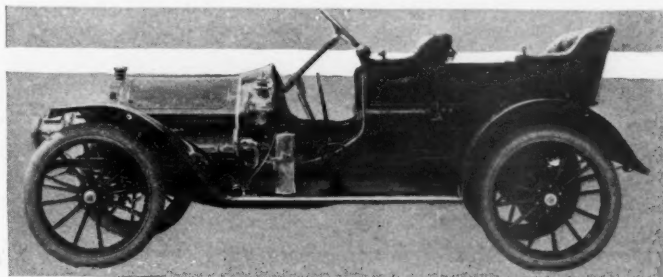
SPEEDWELL IN TOURING CAR FORM WITH SIDE DOORS IN FRONT

and transmission are contained in one housing. The three-point suspension scheme is again found, as are the multiple disk clutch and thermo-syphon cooling.

Regal—As the Regal stands for 1910 the standard features are a 4-inch square four-cylinder motor of 25.6 horsepower, a wheelbase of 107 inches, thermo-syphon cooling and a selective sliding gear transmission giving three speeds forward. These are conventional characteristics, but throughout the new model are to be noted refinements which have been brought about while the model has been prepared for the new market. The gearbox is formed as a unit with the rear axle system and takes its support through a narrow continuation neck bolting to the differential housing, and which is supported through a torsion tube which has a ball-and-socket support at its forward end, the socket being carried on the cross-member of the frame. One of the features of the thermo-syphon cooling system is a double return

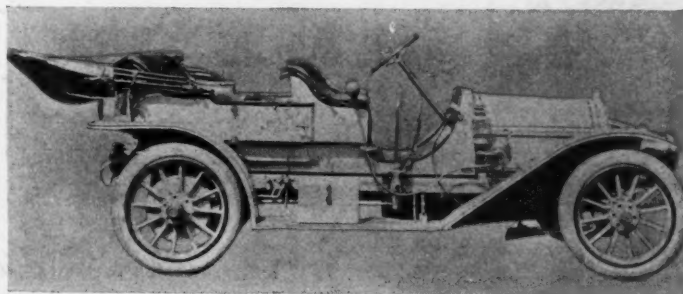
connecting rods dip. The splash also cares for the cylinder walls and piston. Another point worthy of notice is the addition of a piston ring below the wristpin. From the crankcase the oil overflows after it has reached a certain level back into the reservoir, at which point it is filtered before it is recirculated. More space has been given the tonneau in the Regal bodies through the increasing of the wheelbase from 105 to 107 inches. This extra length also permits of the lengthening of the side members of the frame. Four inches extra width has been given the rear seat and sheet aluminum is used in place of wood in the body construction.

Staver—Graduating from the motor buggy field, the Staver Carriage Co., is offering a low-wheeled 30-horsepower pleasure car which shows conventional design and which incorporates several interesting features, chief of which is the torsion tube, which is so constructed that all torsional strain of the axle is carried by the torque tube, which is integral with the axle and hung to a cross member of the frame. There also are strut rods, which hang from this torque member on the direct center of the torque tube. The motor used by Staver is a four-cylinder American and British engine of the L type with the cylinders cast in pairs and using Hess-Bright bearings. Helical-cut gears also are used. The clutch is of the multiple disk type, while the Brown-Lipe transmission, of the selective sliding gear type, giving three speeds forward and reverse, is fitted. Timken roller bearings are used in the transmission, and the transmission case is of aluminum, oil-proof and with the gears running in oil. A double universal joint between the clutch and the transmission furnishes the drive connection and is encased in a leather housing. The car is shaft-drive and the frame is cold pressed steel with a kick up in the rear and curved in front. The front axle, made of pressed steel, is a double-channel construction, while the rear axle is of the full floating type with ball bearings placed 8 inches apart at the wheels. The differential and drive gears are in a cage unit and removable through a back plate on the rear axle. The lubrication scheme is splash with pump circulation, while ignition is had by means of a dual system, Bosh magneto and dry cell. The radiator is of the Mercedes type and the water circulation is by means of a direct drive pump on the motor. In the way of springs semi-elliptic are used in front and full elliptics in the rear, while there are two complete sets of brakes of the expanding type on the rear axle. The wheelbase is 112 inches and the wheels are 34

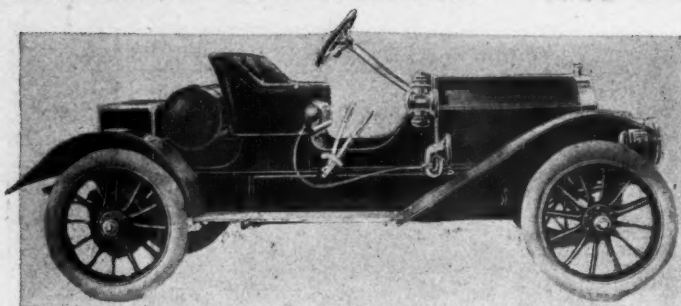


REO FOUR-CYLINDER WITH LEFT HAND CONTROL

pipe from the waterjacket to the radiator. This is about the same as in 1909, the principal change being in the mounting of the fan in a bracket on the front cylinder casting instead of carrying it through brackets from the radiator as before. A steaming radiator is avoided because part of the water goes up and the rest of it down, but if any steam is entrained it loses its heat in the water with which it has mingled in the overflow instead of oozing out. An important change in the transmission is the adoption of Hyatt roller bearings for carrying the main and countershaft whereas before cup-and-cone ball bearings were used. The crankcase is a two-part construction and the lower portion is made larger than before, which permits of its being used as an oil reservoir in the lubricating system, which system has been improved by the placing of an oil gauge on the left side of the crankcase, this gauge containing an indicating disk carried on a vertical rod which at its lower end is supported on a cork float in an oil well. This float responds to the different oil levels the same as the carburetor float, the level being indicated on the glass gauge by means of the indicating disk. As the Regal designer mapped it out, the oil in the oiling system is elevated from the reservoir under one-half of the crankcase by a pump, which delivers the lubricant to the three crankshaft bearings, whence it overflows and furnishes the splash into which the



PENNSYLVANIA OFFERED AS A TOURING CAR



OAKLAND'S MOST RECENT PRODUCTION—THE SMALL CAR

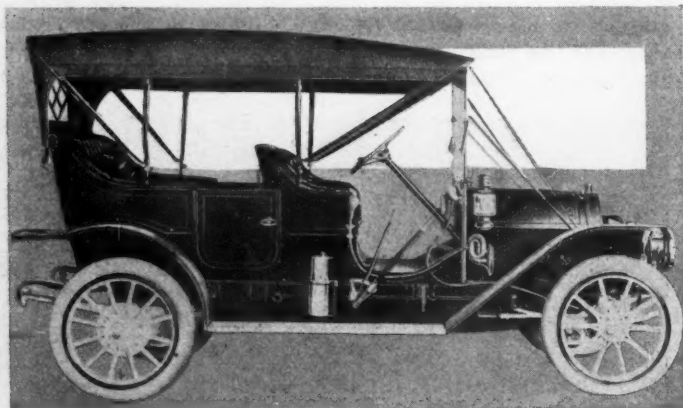
by 4-inch. The steering gear is of the worm-and-sector type and in the way of equipment there are two gas headlights and a gas tank, the usual oil lamps, etc. While the conventional Staver comes with the five-passenger touring car body, a novelty is offered in a body of the torpedo type.

Oakland—The Oakland output for the coming year will consist of four four-cylinder models, a two-passenger runabout and a four-passenger touring car with a 30-horsepower, 4-inch square, L-type, water-cooled motor, and a five-passenger touring and two-passenger roadster with a four-cylinder 40-horsepower motor of the L type, with a $4\frac{1}{2}$ -inch bore and 5-inch stroke; and outside of the oil tank, which is now cast integral with the crankcase, there are no changes in the motor. The valves are all on the left side and driven from a single camshaft contained within the crankcase. Lubrication in the crankcase is splash, the oil level being maintained by gravity feed from the oil reservoir, and a plunger pump, which forces oil through a sight-feed on the dash and then to the center bearing of the motor, is driven off the camshaft. A centrifugal pump, which is gear-driven, a vertical tube radiator and a fan, which is contained in the flywheel, are features of the cooling system; the ignition system is of the double type, with a Remy magneto and a storage battery as current sources. The clutch, which is of the multiple-disk steel and bronze type, has been improved over that of this year by the addition of cork inserts, and the transmission, which is contained in the same housing with the clutch, is of the sliding-gear, three-speed, selective type. Drive to the rear wheels is by shaft and a semi-floating rear axle, which has also been improved and provided with a neater housing. Ball bearings are also provided for the pinion and shafts of the rear axle, and roller bearings are fitted in the rear wheels. There has been a decided increase in the size of the brake drums and in the number of leaves in the springs, the drums having been changed from 14 to 18 inches in diameter, and ten leaves are now employed instead of six. The springs are elliptics in the rear on all models. A few refinements, such as the fitting of aluminum doors to the tonneau instead of wood, widening the body at the rear to make the rear seat more comfortable for three passengers, covering of the floor boards with linoleum bound with brass, the use of improved hinges on the hood and a better lamp equipment complete the improvements.

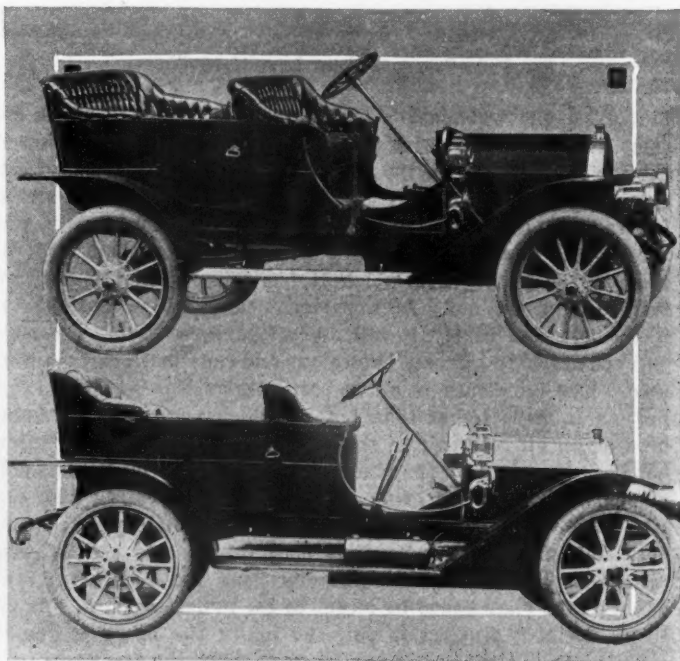
Kisselkar—In an effort to produce a line of motor car models which will meet with every requirement and desire of the motor-

ing public, the Kissel Motor Car Co. has added to its line for 1910 a new chassis known as the F-10 model and which will be fitted with a 7-passenger touring or a 4-passenger baby tonneau body. This model is almost a duplicate of the F-10 chassis, except that two independent ignition systems are used, requiring two separate sets of plugs with a Bosch high-tension magneto and an Atwater Kent generator as current sources; the wheelbase is 124 inches, and the tire dimensions are 36 by 4 inches on the touring types and 40 by 4 inches on the baby tonneau cars. On all models the angularity of the radiator and hood has been substituted by curves, which add greatly to their appearance; wheelbases have been lengthened and the wheels enlarged; the frames are heavier and raised above the rear axle to facilitate spring suspension and action; both brakes are now of the internal expanding type, operating side by side on the rear wheel drums instead of the internal and external sets, as in 1909 models, and improvement has been made in the attachment of the three-quarter elliptic springs to the rear end of the frame. The only change observed in the motor is the removal of the magneto from the right to the left side, so that now the fan-belt pulley, water pump and magneto are driven by the same gear. In the LD-10 models, which are a development of the LD-9 models of last year, the wheels are increased from 32 to 34 inches in diameter and the tires from $3\frac{1}{2}$ to 4 inches, and the wheelbase has been increased from 107 to 112 inches. The wheelbase of the D-10 models, which in the D-9's of last year measured 115 inches, is now longer by 5 inches. The entire motor is heavier in construction and has been increased in power by enlarging the cylinders to a bore of $4\frac{7}{8}$ instead of $4\frac{3}{4}$ inches, and the valves from $1\frac{3}{4}$ to $2\frac{1}{4}$ inches. And the gearsets now give four forward speeds instead of three, with direct drive on third speed, and are equipped with standard ball bearings. These changes have also been made on the G-9 six-cylinder models, which for 1910 will be known as G-10 models, according to the announcement made by the Kissel company for the coming year.

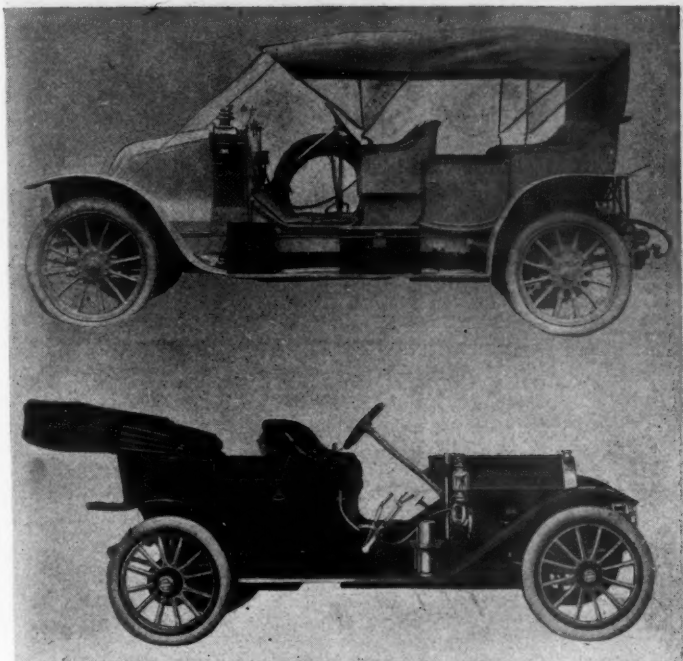
Falcar—The Falcar, a Chicago product which was placed on the market during the season of 1909, comes before the public in 1910 in about the same form, the changes on it being more in the nature of refinements than radical departures from the conventional. The car is equipped with a new design of four-cylinder 35-horsepower motor, on which the bore has been increased to $4\frac{1}{8}$ inches and the stroke to $5\frac{1}{4}$. Then, too, the wheelbase has been increased to 116 inches and the transmission moved farther forward, where it is supported by a new three-point suspension



OHIO TOURING CAR, MADE BY JEWEL COMPANY



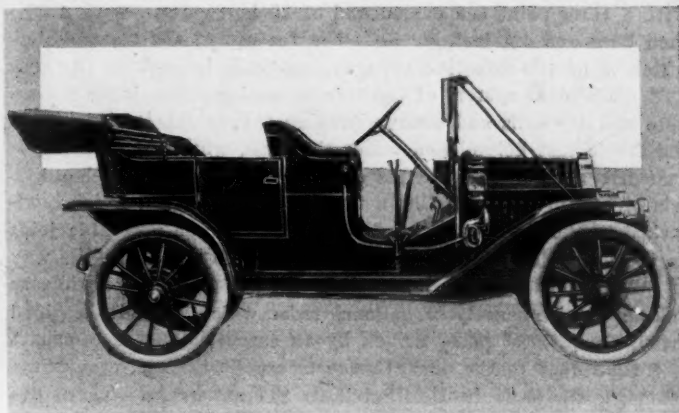
PATERSON 30, JUST ON THE MARKET
PIERCE-RACINE FIVE-PASSENGER TOURING CAR



RENAULT BUILT ESPECIALLY FOR AMERICAN USE
NEW PRODUCT OF STAYER FACTORY

which, besides affording easier access, allows of a straighter line of driving shaft. Improvement is noted in the oiling system, one of the features of which is a lever which controls dials on the right hand side of the crankcase so that the oil level may be placed at any desired height by adjusting the dial hand. The size of the rear tires has been increased and now is 34 by 4, and the steering wheel measures 18 inches in diameter. The Falcar motor has its cylinders cast in pairs with the valves all on one side, and the large waterjackets are unique in that they have openings through which sand and grit may be removed and the cylinder castings inspected. There is a brass plate covering to the cylinder heads which forms an outlet to the radiator. The crankcase is a one-piece aluminum casting. The oiling pump, of the force-feed type, operated by a bevel gear from the camshaft, is contained in the lower half of the case, which is so constructed that dirty oil and sediment may be flushed from the motor and crankcase by kerosene, which is removed by means of a plug at the bottom of each compartment. Connecting rod bearings are lubricated by splash, coming in direct contact with the oil supply in the crankcase. The motor gears are housed in an oil-tight compartment in the crankcase and run in oil. The valves with heads electrically welded to the stems, are taper-seated, mechanically-operated and interchangeable. The housing, containing the differential gears is a steel casting split vertically at the center line, an aid to strength and rigidity. The worm-and-nut type is used for the steering gear, and thrust bearings are placed above and below the worm. The front axle is a one-piece drop forging of I-beam section with the spring saddles forged integral. Bearings of a large size support the pivot point of the steering knuckles, there being a one-piece connecting rod located between the front axle and between the steering knuckles. The drop frame is of cold-rolled pressed steel of channel pattern and on the cross members are the transmission torque hanger at the rear end of the motor. Vanadium steel springs form the method of suspension, three-quarter elliptics being used on the rear. The Falcar furnishes bodies designed to carry two, four and five-passengers and the standard color is Acme blue.

Midland—Coming as a toy tonneau and a touring car in the smaller model and as a touring car in the larger one, the Midland Motor Co. produces two chassis, one of them 35-horsepower and the other 40. In the smaller car the four-cylinder motor has its cylinders cast in pairs, showing a bore of $4\frac{1}{2}$ inches and a stroke of 5 inches. The ignition scheme consists of a Remy magneto and battery, while the radiator is of the vertical flat tube type;

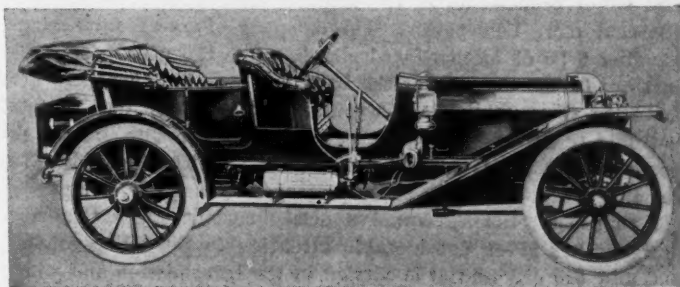


MOLINE IN ITS NEW DRESS

the transmission is selective and the drive shaft. The clutch is a floating ring device and the wheelbase 115 inches, the wheels carrying 34 by 4-inch tires. There are four brakes. There is not much difference between the two chassis, the main points of variance being that the 40-horsepower naturally is a trifle larger as to engine. The extra horsepower is secured by adding $\frac{1}{4}$ -inch to the stroke, the bore remaining the same. A feature of the Midland is that the cylinders are mounted on the crankcase with a $\frac{3}{4}$ -inch offset toward the side of the power stroke, it being claimed that this reduces the angularity of the thrust and delivers the full power stroke to the crank with the least possible loss, especially when used in connection with a long stroke. The crankcase is a two-piece aluminum construction, the upper part carrying three crankshaft bearings made of nickel babbitt. A positively driven plunger pump is employed in the lubricating system, which is contained entirely within the crankcase. The Midland clutch, which is carried on roller bearings on the extension of the crankshaft, is made of three disks, the middle disk doing the driving and being mounted on studs in the rear edge of the flywheel. This disk is of phosphor bronze and is fitted with cork inserts, while the other two disks are of steel and are forced in contact with the bronze disks by coil springs.

Ohio—Many changes have been made in the Ohio 40, so that the new model looks considerably different from the old one. In brief, these changes may be noted as follows: The springs are half-elliptic in front as well as rear, the wheelbase is 115 inches, a full floating rear axle is employed, the bearings are F & S throughout, the motor is the T-head type, with the valves on opposite sides and with cylinders cast in pairs; there is splash lubrication, thermo-syphon cooling assisted by a large aluminum fan, a three-plate disk clutch with the center plate lined on both sides with raybestos; selective type sliding gear transmission, unit power plant with a three-point suspension, nickel steel transmission gears in the shaft and steering gear of the nut-and-screw type. The fenders and running board shield are made integral.

Courier—Although the Courier is the direct result of the Stoddard-Dayton's desire to enter the low-priced field, the Courier bears no resemblance whatever to the Stoddard, and there has been no attempt whatsoever to copy. Everything about the car is new, with the motor and the transmission the features. The motor is cast en bloc and is of the four-cylinder four-cycle type,

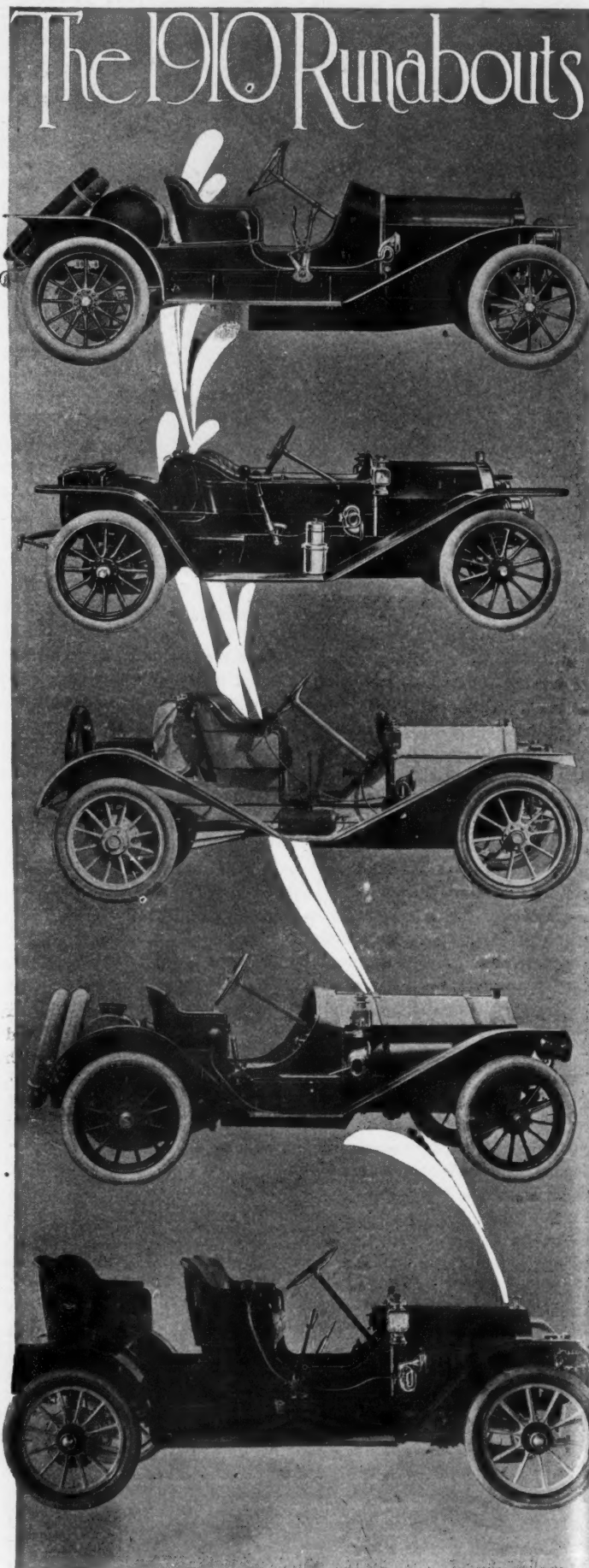


KISSELKAR OF THE MODEL G 10 TYPE

with a three-point suspension and of 25 horsepower, with a 3¾-inch bore and 4½-inch stroke. The feature of the transmission, which is of the selective type, is that it is located on the rear axle. The dual system of ignition is employed, utilizing a magneto and dry cells and a non-vibrating coil, which is attached to the frame just behind and under the dash, while the magneto is gear-driven through a flexible coupling. The thermo-syphon system of cooling is assisted by a vertical tube radiator, which is attached to the side members of the frame through a flexible joint on the left side and a solid connection on the right. In the way of lubrication there is a reservoir in the bottom of the crankcase holding approximately 2 gallons, from which the oil is piped through a plunger pump driven by an eccentric on the camshaft to a sight feed to the dash, thence to crankshaft and crankshaft bearings, where it is distributed to the crankcase. There are grease cups on the fan, steering gear, spring shackles, brake rod bearings and steering joints and knuckles. The clutch is cone type and leather-faced, while the drive is through radius rods. The control is on the steering column, the spark and throttle being on the left hand under the wheel. When the emergency hand brake is used it releases the clutch and applies the internal brake. Shaft-drive is used and the rear axle is of the semi-floating type with a Brown & Lipe differential. Hyatt roller bearings are fitted and the transmission is located on the rear housing. The front axle is a one-piece drop forging of the I-beam type and the springs semi-elliptic in front and three-quarter-elliptic in the rear. The wheelbase is 100 inches and the wheels 32 by 3½.

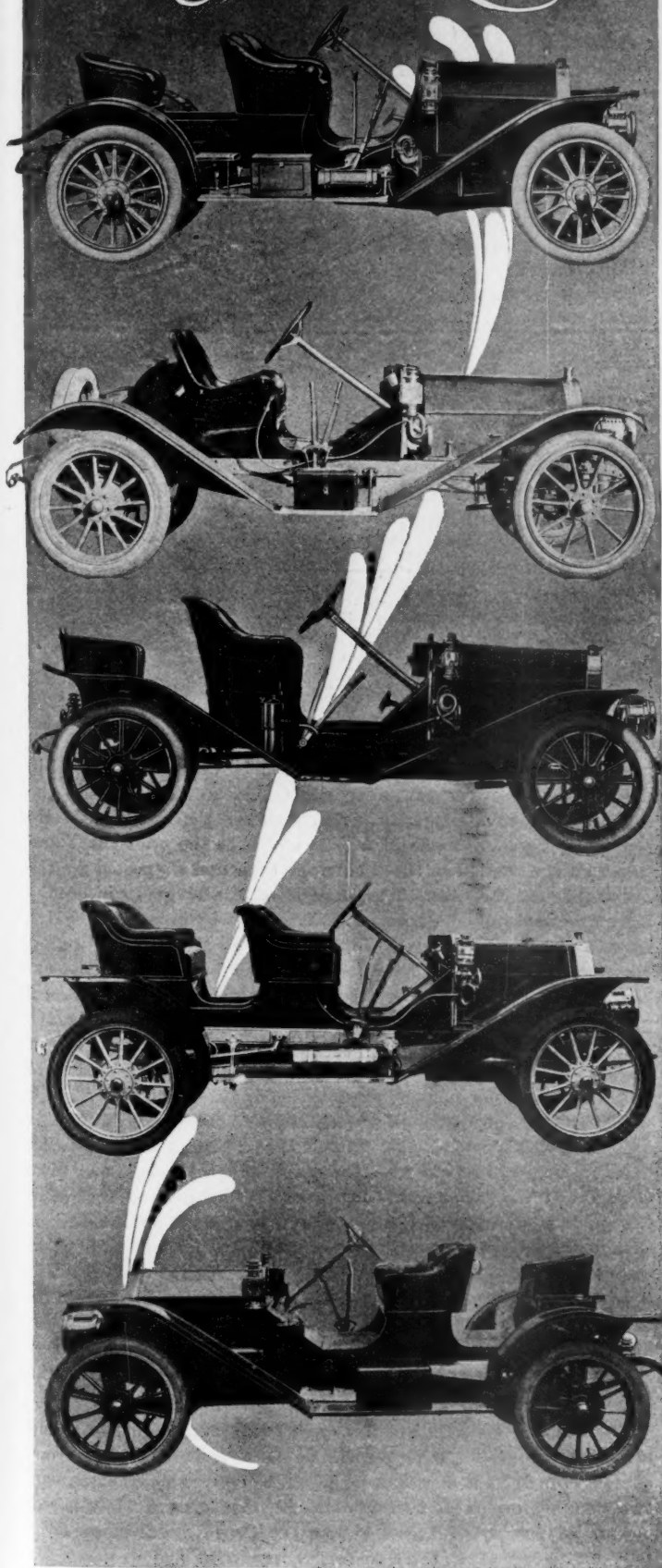
Speedwell—The Speedwell motor for 1910 shows 50 horsepower with a bore and stroke of 5 inches square, the cylinders being cast in pairs with integral cylinder heads and valve chambers, but with separate waterjacket heads. Nickle aluminum alloy is used in the crankcase and the gearcase is cast integral. Oil leakage is avoided by making the crankcase flanges unusually wide and bolting them closely together. The crankshaft is forged from nickle steel, while the connecting rods are drop forgings. The camshaft is of high carbon steel, with the cams integral and running in three long phosphor bronze bearings fitted with oil pockets. The gears are of bronze and steel, with the gears cut spirally and lubricated from the crankcase. The bearings are of white bronze. The ignition system uses the Bosch dual type, combining a small armature and battery and with but one set of spark plugs to the system. The lubrication idea is of the self-contained force-feed type, and the oil gauge is located between the cylinders. More than forty oil and grease cups are used on the car. The Speedwell transmission is of the selective sliding type, giving three speeds forward, the gears being of Halcumbe vanadium steel and the driveshaft of nickle steel. Both ends of the driveshaft and the jackshaft run on Timken roller bearings, while the male shaft runs on plain rollers. The clutch is of the leather-faced cone type. The front axle is a one-piece drop forging of I-beam section, with the wheels mounted on Timken rollers. The cross rod connecting the steering arms is placed in the rear and above the axle. The rear axle is of the full floating type, while the Speedwell frame is of channel section pressed from carbon steel, the frame being arched over the rear axles. The cooling is by centrifugal pump, which is gear-driven, while the cellular type of radiator is used.

Chadwick—In a nutshell, the Chadwick changes for 1910 consist of an increase in size of carbureter, inlet pipes, exhaust pipes and slight refinements in the engine, which give from 10 to 15 per cent more horsepower. The company offers an internal expanding type of leather-faced clutch, while the wheelbase is 130 inches. In the touring car the body has been lengthened to give more leg room, while on the tourabout the cowled dash is used not only to give a racy appearance to the car but to protect the passengers in the front seat from the wind. The Chadwick line for 1910 will consist of a seven-passenger touring car, five-passenger tourabout, limousine and a demi-limousine. The Chadwick designer has given considerable attention to the oiling scheme, and now the differential is carried in the transmission and where the shaft enters the transmission and the jackshafts leave it are small circular disks of felt. The front and rear bearings



PREMIER ROADSTER WITH GASOLINE TANK IN REAR
SPEEDWELL OFFERING WITH DOORS TO FRONT SEATS
MARMON WITH A TWO-PASSENGER BODY
CHADWICK WITH ENCLOSED DRIVING CHAINS
MORA LIGHT FOUR WITH A RACY TYPE BODY

and Speed Cars

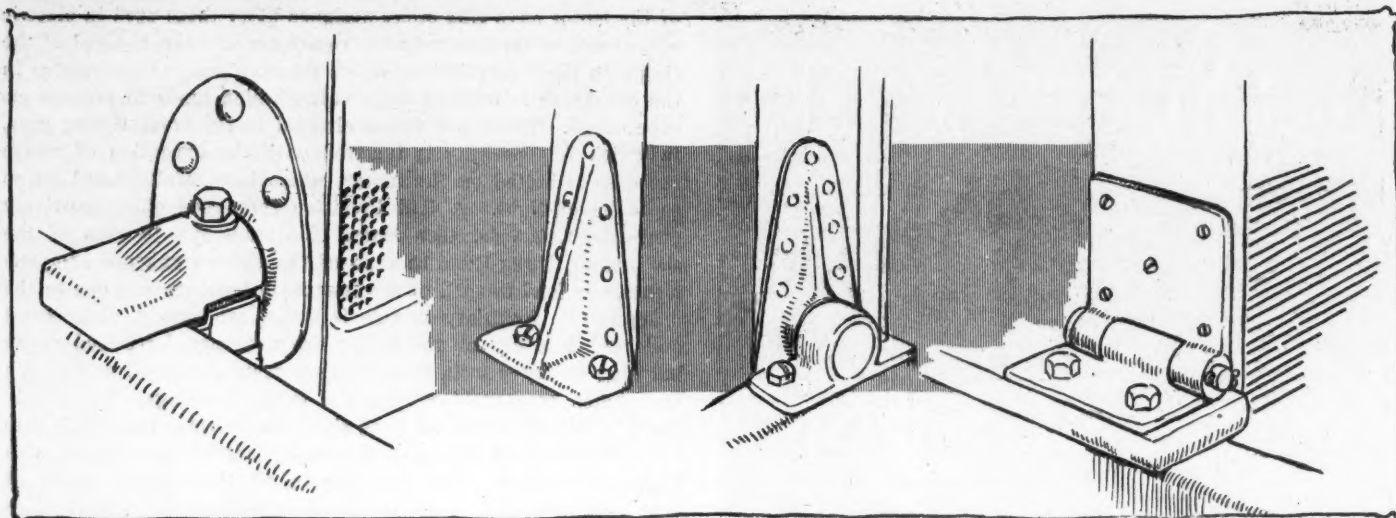


STODDARD-DAYTON WITH A RUMBLE SEAT
 FALCAR, A CHICAGO PRODUCT, IN RUNABOUT FORM
 HALLADAY WITH ROOM FOR THREE PEOPLE
 COLE 30 MAKING ITS DEBUT—A DETROIT NEWCOMER
 PULMAN SHOWING ITS 1910 DETAILS

of the motor have ring oilers designed after those used in electric motors and so constructed as to return the oil from the end of the ring into the reservoir into which the ring runs. Compression in the crankcase is relieved by a valve, which tends to prevent escape of oil. There is a recess channel in the front timing gear, in which felt packing is inserted with the exception of where the case is bolted on the motor, which is carefully faced off so as to be oil-tight. A Hill Precision force-feed oiler, positively gear-driven, has fourteen leads. Six leads run to each of the six pistons, three leads to each of the three crankcase compartments, one lead to each of the four main bearings and one to the differential. Auxiliary to this is the splash system. The front and rear bearings of the motor are not only force-feed oiling but ring oiling as well, there being a reservoir of oil under each one, which constantly supplies oil to the bearings. The crankshaft is drilled to pass oil from the main bearings through it into the connecting rod bearings, the crankshaft being equipped with banjo oil catches. The force feeds oil the cylinder walls as does also the splash, and the splash system serves additional as cooling for the inside of the cylinders.

Halladay—While no radical changes have been made in the Halladay, the new models show improvements in construction, quality and appearance, the wheelbase having been lengthened to 128 inches, an increase of 5 inches, while the wheels now are 36 inches. A kick-up frame and fenders cut into the body give the car a low-hung appearance, which is secured without in any way reducing the road clearance. Another change has been to fit the transmission with annular bearings, while the controlling levers have been changed to the rocking selective type. Imported ball bearings are used throughout the car. When it comes as a baby tonneau the Halladay shows a longer hood, a dash cowl, short-coupled body, a steering body of extra length and slanted to the extreme, short side levers, and long and rakish fenders. The model J, while a new one in the line, is the duplicate of the model D, except that it is smaller. The model D is of 40 horsepower, while the J is 30. Models E, F and G, which come on the same chassis, are 28 horsepower. The J uses a Rutenber four-cylinder motor of 4-inch bore and 4-inch stroke, using the splash system of lubrication, the oil being circulated by a pump which is integral with the motor. The transmission is selective and the Bosch magneto single system of ignition is employed. The clutch is a multiple disk; the wheelbase is 110 inches, the wheels 34-inch, while the frame is pressed steel. Shaft-drive is employed, while semi-elliptical springs are used in the front and full elliptics in the rear. The 28-horsepower chassis is a four-cylinder motor with the cylinders cast separately and with a bore of $3\frac{3}{4}$ inches and a stroke of $4\frac{1}{2}$. The transmission is selective, the clutch multiple disk and a choice is given of a Bosch magneto system or the Remy dual system of ignition. The lubrication is splash, and three choices of bodies are offered. The wheel base is 104 inches. Noted on the Halladay 40 are a four-cylinder Rutenber engine with a $4\frac{1}{2}$ -inch bore and 5-inch stroke, selective type of transmission, splash lubrication, two systems of ignition, wheelbase of 123 inches, a tread of $4\frac{1}{2}$ inches, a multiple disk clutch, pressed steel frame and 36-inch wheels.

Cole—For the first time the product of the Cole Motor Car Co. is to be seen in a national show, the car being a recruit of 1910. In general outlines it is a four-cylinder four-cycle water-cooled car with a 30-horsepower motor, the motor being of the vertical L type with the cylinders in pairs. On the left side of the motor are the adjustable valves tappets which are operated from a single camshaft contained in the crankcase. The timing gears rotate in a bath of oil in an oil-tight housing cast integral with the forward end of the crankcase. Three large bearings in the upper half of the aluminum crankcase support the crankshaft, and access to the connecting-rod bearings being had by removing the lower half of the crank chamber. Other features of Cole construction are the unit construction of the power plant supported by four legs on a subframe; an enclosed flywheel and clutch mechanism; the shaftdrive and propellershaft enclosed in a torsion tube; thermo-syphon cooling and dual ignition. The car



MARMION RADIATOR SUPPORT

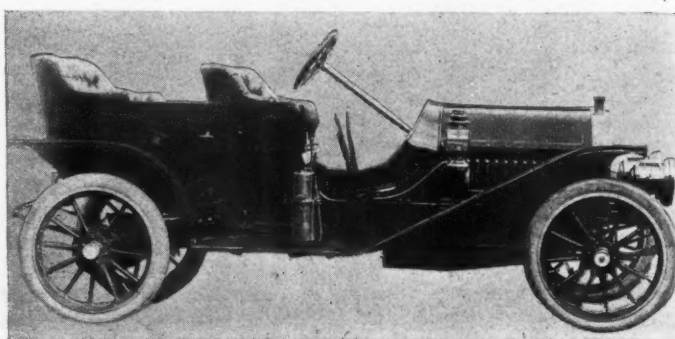
PREMIER RADIATOR SUPPORT

FALCAR RADIATOR HINGE

has 108-inch wheelbase and 32 by 3½-inch tires, but something out of the ordinary is the fact that the tread is offered in 56 or 61-inch sizes. Lubrication of the motor is by splash, the oil level being maintained by means of a positive plunger pump which is located in the oil reservoir cast integral with the motor. There is a ball gauge on the left-hand side which shows the oil level. The parts that go to make up the cooling system comprise the thermo-syphon principle, which is backed up by a vertical-tube radiator and an adjustable belt-driven fan. The dual system of ignition is furnished by a Splitdorf magneto or a set of dry cells, there being a non-vibrating coil. Enclosed in the flywheel housing, which is cast integral with the crankcase, is a leather-faced cone clutch of the self-centering type, and the case of the clutch mechanism is bolted to the case of the flywheel housing and to it, in turn, is attached to the gearbox.

Pullman—Among the three chassis models of Pullman cars manufactured by the York Motor Car Co. is the model K 30-horsepower touring car. In this car several changes have been made. The wheelbase has been increased 5 inches, making it 112 inches long. This change permits of a roomier tonneau, adds to the easy-riding qualities, and gives better lines to the car. The power of the motor has been increased by lengthening the stroke to 4¼ inches and by enlarging the valves. The radiator, by reason of the increased size of the hood, has larger dimensions and affords a greater cooling surface. The hood and dash this year are higher, giving a more attractive appearance to the fore part of the car. The drop-frame construction has been adopted, permitting a lower center of gravity and producing a more racy effect. A double system of brakes on the rear axle with equalizers also is an innovation which is bound to count for perfect control and safety.

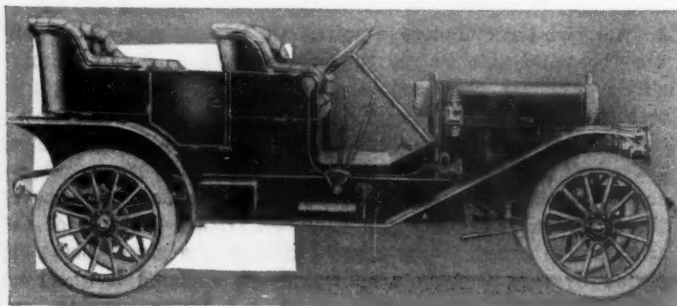
Paterson—A newcomer in the business, the W. A. Paterson Co., is offering only one chassis model with which, however, goes three body designs, a five-passenger touring car, a demi-tonneau and a tourabout. The motor shows 30 horsepower and it is featured by having the cylinders cast in pairs. The valves are all on one side and adjustable and the ports to which they are



ONE OF THE REGAL LINE, MODEL E

removed for grinding purposes are closed by means of screwed-in plugs, the ones over the inlet valves being threaded for the reception of spark plugs. The bearings for the crankshaft and connecting rods are made in halves, and both the crankshaft and camshaft are carried in three bearings each and supported by the upper half of the case. The location of the magneto is on the right-hand side of the motor and is driven by a gearing which is enclosed in the forward timing gear housing. The motor, clutch and transmission form a unit, all working parts being enclosed in a single case. The power plant rests on a pressed steel subframe and can be removed by taking out four bolts. In the way of lubrication, the splash is used, the oil reservoir being at the bottom of the crankcase and the oil from which is forced to the crankcase by a plunger pump. A single float oil lever gauge permits of an inspection of the oil supply. Water circulation is by means of a thermo-syphon system, and assisting in the cooling is a fan which is driven from the crankshaft by a flat belt. The clutch is of the cone type. Three speeds forward can be had in the gearset, the gearshafts running on annular ball bearings. Two universal joints, a carbon steel propellershaft and a differential transmit the power to the rear wheels. The rear axle housing is composed of heavy steel castings and tubing, the axle shafts running on Hyatt roller bearings. Two sets of brakes are used, both acting directly on the rear wheels. The frame is pressed steel and the front axle is tubular. Ball bearings are used in the front wheels.

Black Crow—Chicago has few car manufacturing concerns, and the Black Mfg. Co. with the Black Crow is one of those few, offering for 1910 a new line of pleasure cars, which consists of two chassis, one a 25-horsepower and the other a 35-40-horsepower. A variety of bodies accompany these, the 25-horsepower line consisting of a three-passenger roadster, a four-passenger surrey and a four-passenger pony tonneau. In the 35-40-horsepower a touring car is turned out. The 25-horsepower motor is of the en bloc type and shows a bore of 3¾ inches and a stroke of 4½. The motor is a T-headed engine and the valves are on

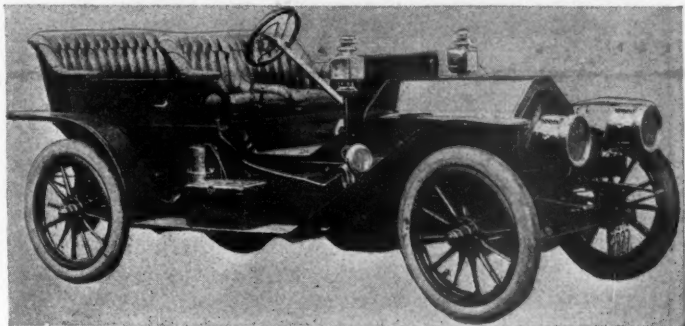


BLACK CROW, MODEL F, 25-30 HORSEPOWER

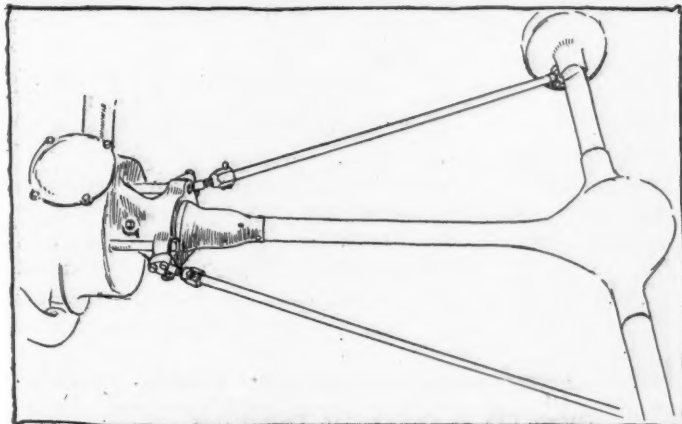
opposite sides, mechanically operated and interchangeable. The camshafts are enclosed in the crankcase, which is of aluminum alloy and cast in three horizontal sections. There are five large bearings on the crankshaft, which is a drop forging. The lubrication scheme is a self-contained constant level splash system, assisted by a circulation pump. There is a selective sliding-gear transmission which gives three forward speeds, and the transmission shafts run on Hyatt roller bearings. The thermo-syphon system of water-cooling is employed, assisted by a large fan, while the radiator is of the honey-comb type. A combination of a Remy magneto and dry cells is used in the ignition scheme. The clutch is a multiple disk; the wheelbase is 107 inches; the wheels 32 inches; the front axle cold-drawn seamless steel tubing; the rear axle of the floating type; the bearings all Hyatts with the exception of the front wheels, which run on two-point ball bearings; the springs are semi-elliptic in front and full elliptic in the rear; shaft drive is used, and the frame is channel section pressed steel. The Black company shows only the chassis of its big car because the fire that destroyed the body plant at Racine burned up 200 of its bodies. The 35-40-horsepower car has a motor with its four cylinders cast in pairs and with the waterjackets and valve chambers integral. The bore is $4\frac{1}{4}$ inches and the stroke $4\frac{1}{4}$ inches. In other respects it is similar to the smaller model with the exception that the wheelbase is 120 inches; that the valves are all on one side; that there are three instead of five bearings in the crankshaft; that the wheels are 34 instead of 32 inches, and that the front axle is pressed steel.

Middleby—The Middleby is one of the air-cooled family and is offered with a horsepower rating of 25.6, the motor being square, 4 by 4. The cylinders are cast singly. The Middleby people are adherents to the progressive transmission idea and also employ splash lubrication and shaft drive. The air-cooling is brought about by a belt-driven fan in front, aided by a flywheel suction fan. On the touring car a Splitdorf magneto furnishes the ignition; on the surrey there is the double and single system, while the runabout uses batteries. The body styles consist of a touring car, toy tonneau, a single rumble surrey and a runabout.

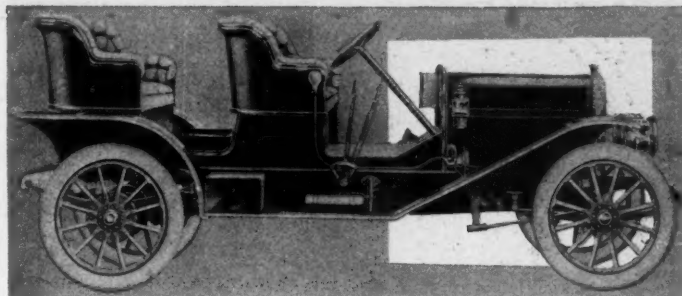
Hupmobile—The little Hupmobile was placed on the market during the season of 1909, and having successfully passed through



MIDDLEBY AIR-COOLER MADE IN THE EAST



HUPMOBILE TORSION TUBE AND STRUT RODS

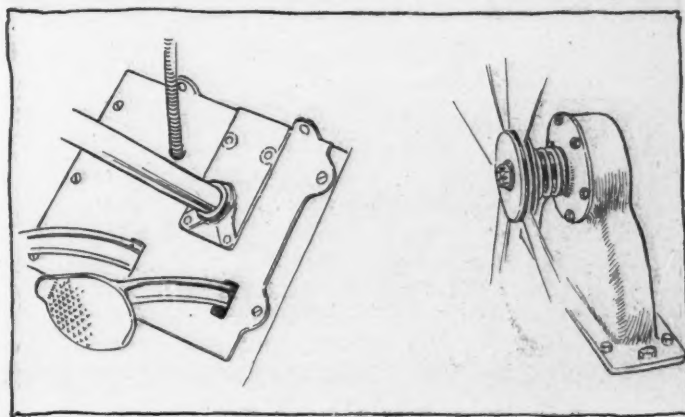


BLACK CROW AS FOUR-PASSENGER MACHINE

an extensive experimental stage, enters the field for the season of 1910 the same in principle but with a few slight changes to enhance its strength, simplicity and refinement. The motor remains unchanged, except for a slight change in the control of the lubrication by means of a sliding cam attached through a rod to the foot throttle, and an increase in the size and efficiency of the radiator. To replace the cone clutch of 1909 a multiple-disk type is now employed, which is comprised of ten plates of saw-blade steel. New Departure ball bearings of the double annular type are provided at both ends of the drive shaft to replace the ball-and-cone type previously used; the rear spring is heavier, wider and has one more leaf, and the means of its attachment to the frame has been improved. An I-beam drop-forged front axle is fitted this year instead of a tubular one; the gasoline tank has been changed from an oblong to an oval shape, with an increase in its capacity from 10 to 11 gallons; the seats are 2 inches higher and wider; the lamp equipment is better; circassian walnut is used for the dash instead of redwood, and the entire body finish has been refined.

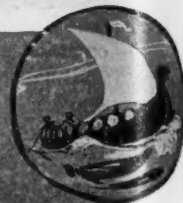
Mora—The addition to the Mora line for the next year is a new low-powered roadster, so that now the Mora family includes a five-passenger Light Four tourer, a four-passenger Light Four roadster, a four-passenger Light Four racing car, and a Mora two-passenger runabout. In addition the company has a limousine and a seven-passenger car. In the way of alterations in the line, the Mora motor for 1910 is of the T instead of L type, while the bore and stroke are $4\frac{1}{2}$ and $5\frac{1}{8}$ inches respectively, whereas in 1909 it was 4 by $5\frac{1}{4}$. Then, too, the Mora for the next year is equipped with a double independent system of ignition, the Bosch magneto being used, whereas heretofore the magneto has been optional. Two inches has been added to the wheelbase of the Light Four, making it 112 inches. There is a new oiling system of the circulating type.

Crawford—The Crawford for 1910 has a four-cylinder motor $4\frac{1}{2}$ inches square with the cylinders cast in pairs and a horsepower rating of 28.9; a cellular radiator and a centrifugal pump aid in the cooling, while a Remy magneto and dry cells make up the ignition outfit. The lubrication is by pump and the clutch is of the cone type. The selective type transmission gives three speeds and is attached to the frame. The car is shaft-drive and has a wheelbase of 110 inches. The frame is of pressed steel.



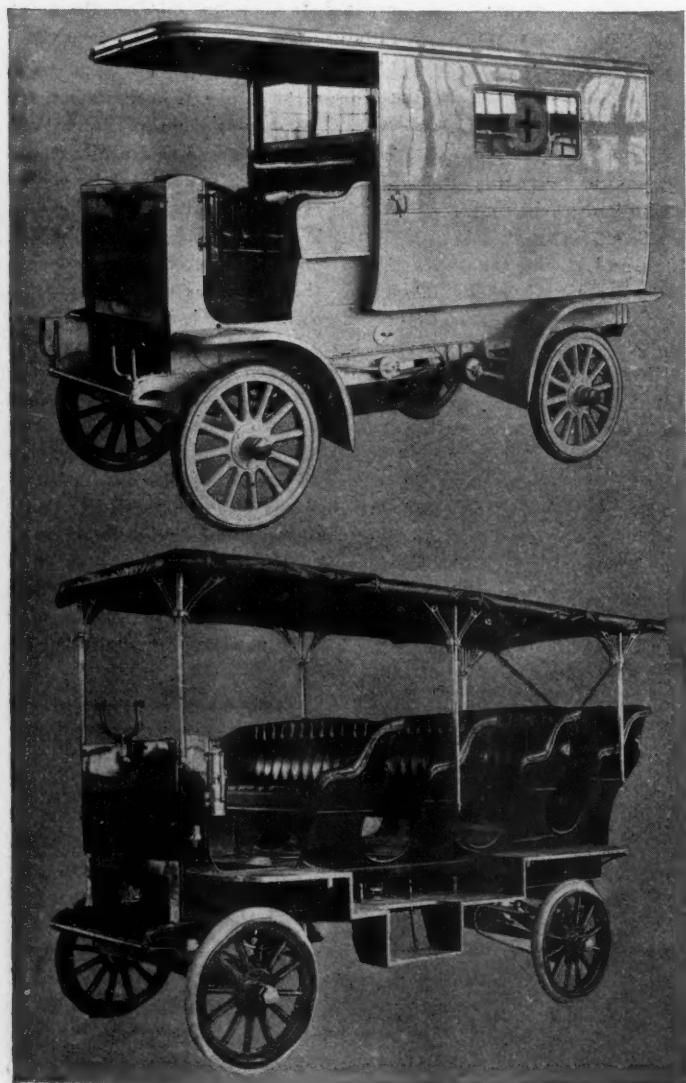
FALCARR FOOT-BOARD: MORA'S SPRING FAN CLUTCH

COMMERCIAL CARS

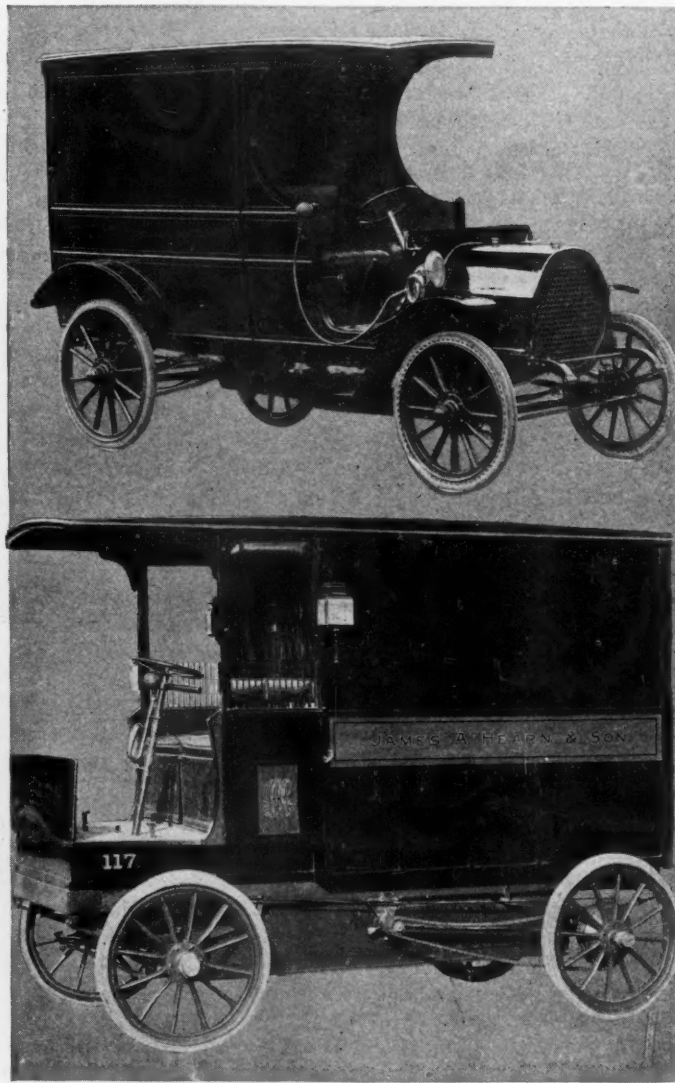


Rapid—Although the Rapid Motor Vehicle Co. had out a four-cylinder commercial proposition for 1909 it was not pushed much, the company spending the year in perfecting the big machine. It was a 5-ton proposition with a motor having a bore and stroke of $5\frac{1}{2}$ and $6\frac{1}{2}$ inches respectively. For the coming year, however, this model will be pushed to the front, and along with it will be the most recent addition to the Rapid family, another four-cylinder, but of smaller size, a 3-ton, with the cylinders, of the L type, cast in pairs and having a bore of $4\frac{3}{4}$ inches and a stroke of $5\frac{1}{2}$ inches, giving a rating of 45-50 horsepower. On both this and the big truck the feature is the springs, which are of the bump-shock construction, the rear springs being set at an angle of 45 degrees instead of working up and down. Also new in the Rapid line is a 1-ton truck with a two-cylinder double-opposed motor which is along the same lines as the $1\frac{1}{2}$ -ton truck of this

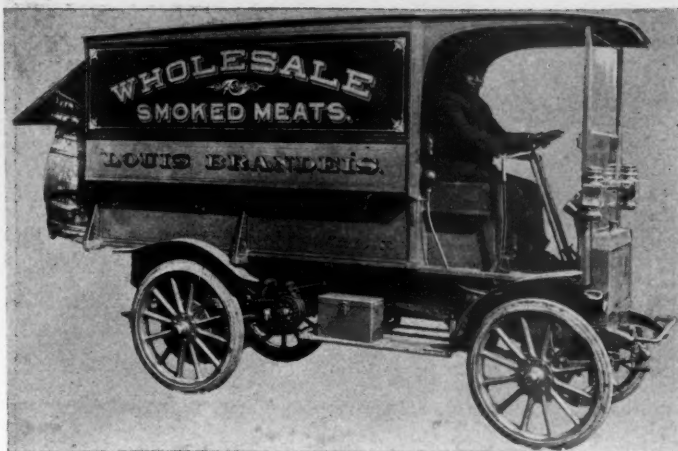
year. The new 3-ton, which weighs 6,000 pounds, has a wheel-base of 138 inches and the wheels are 36 by 5 in front, with solid tires, and 36 by $3\frac{1}{2}$ in the rear and fitted with duals. It is shaft drive. The transmission is selective sliding and gives three speeds ahead, and the clutch is of the multiple-disk type, whereas the two-cylinder Rapids are planetary. The oiling scheme involves a Lavigne mechanical oiler, while a gear-driven water pump assists in the cooling. A general utility body of the combination stake type goes with this model. In all the Rapid line for 1910 is made up of ten models, eight of which are of the two-cylinder variety and designed for all kinds of commercial use. There is one for the furniture man, one for florists and dry cleaners, one for grocers and express deliveries, one for transfer wagons, baggage and pianos, one for hardware and lumber, one for a passenger sight-seeing car, one for an ambulance, while the



RAPID FITTED WITH A CLOSED BODY
RAPID CARRYING RUBBERNECK COACH BODY



GAETH CAR AS COMMERCIAL PROPOSITION
LANSDEN FITTED FOR LIGHT DELIVERY WORK



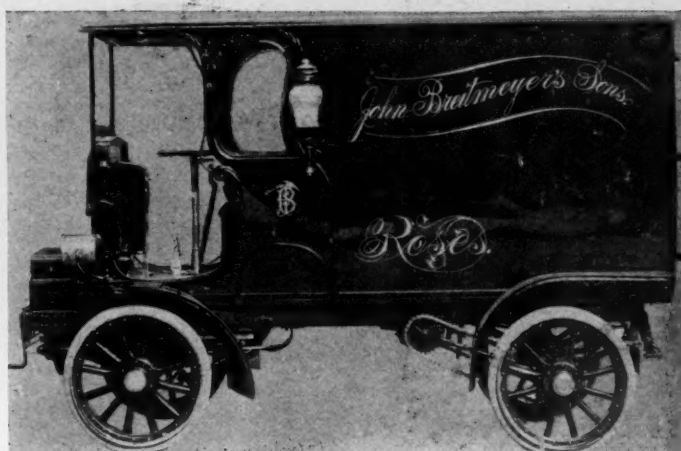
RANDOLPH IN SERVICE OF A BUTCHER

others are a 3-ton truck, a 5-ton and a 1-ton. On the two-cylinder an angle steel frame has replaced pressed steel. One each of these models are shown.

Grabowsky—Two different chassis, representing twelve types of commercial cars, are found in the display made by the Grabowsky Power Wagon Co. In the 30-35-horsepower type there are nine models and three in the other. The specifications on the smaller-powered chassis show a two-cylinder motor with the cylinders cast singly and with a bore of $4\frac{1}{2}$ inches and a stroke of five. It is a water-cooler employing the thermo-syphon system and utilizes a storage battery or magneto in the ignition scheme. The transmission is planetary, and the drive is by chain. The clutch is of the cone type; the wheelbase is 102 inches and the wheels 32 by $3\frac{1}{2}$ -inch. The brake system is conventional, there being an external hub brake on the rear wheels and constricting brake on the transmission. The capacity of this truck is 1 ton. The 40-45-horsepower chassis is also a two-cylinder proposition, with the bore 6 inches and the stroke 5. The wheelbase is 127 inches, but in other respects the chassis is similar to the 30-35-horsepower. The load capacity is 2-ton.

Lambert—This friction-drive car is turned out in two chassis types, but offering three models, two of which are in the 28-30-horsepower class, one of them a detachable tonneau and the other a touring car, while the third, the 40-horsepower, is also a touring car. In general detail the 28-30-horsepower employs a four-cylinder motor with the cylinders cast en bloc and with a bore and stroke of 4 inches square. The drive is by chain and the thermo-syphon system of cooling is utilized, the radiator being of the round tube type. The ignition is jump spark and magneto, and the steering is of the worm-and-sector type. The tire diameter is 32 by $3\frac{1}{2}$ -inch and the wheelbase is 10 inches. Two brakes are used, both of the expanding type. In the 40-horsepower model the four cylinders are cast singly, but the bore and stroke remain the same, 4 inches square. On this model the wheelbase is increased to 115 inches, and the wheels are larger by 2 inches. In place of the wood body used on the others, metal is employed. Cooling is effected by a pump instead of the thermo-syphon system, but the radiator is of the same type. Another point of variance between this and the other models is in the steering, which is of the screw-and-nut type.

Randolph—The plans of the Randolph company for 1910 are not as yet fully matured and it will not be known for another week or 10 days just what the new line will contain. For the palace show the Randolph company has a new 1-ton truck, but it is more than probable that before the season opens it will have a 5-ton, a 2-ton and a light delivery wagon ready for the market. In the 1-ton truck on view—which, by the way, is the only one made of this type for 1910—it is noted that the company has switched about and made the stroke longer than in 1909, the motor being of slower speed than heretofore. Instead of a bore and stroke of $5\frac{1}{4}$ and $4\frac{1}{2}$ inches, the new engine shows $4\frac{3}{4}$ and $5\frac{3}{4}$ inches, developing 20 horsepower. The engine itself, a two-cylinder double opposed, is of an improved type, the feature of

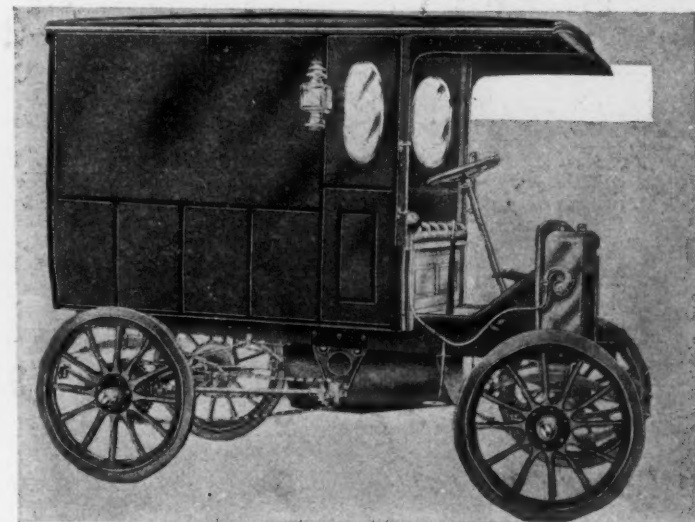


ONE OF GRABOWSKY'S LIGHT DELIVERY WAGONS

which is its accessibility. The wheelbase has been increased 5 inches and now stands at 100 inches. A change also has been made in that instead of using a Lavigne force-feed oiler, there is an internal oil pump in a pan under the motor, an idea that is somewhat similar to the scheme used on the 1910 model 10 Buick. Instead of batteries ignition is had by means of a magneto.

Kline—The B. C. K. Co., besides making Kline pleasure cars, has a commercial line also, offering four types of bodies which are adapted to one chassis. The stake-body machine is designed to carry bales and large boxes and there also is an express body turned out. The other two consist of a closed body and a wagonette, the latter being able to accommodate eight persons besides the driver, four being placed on each side. The motor is a two-cylinder which develops 16-20 horsepower, the valves being mechanically operated and the frame being of pressed steel. The thermo-syphon system of cooling is used and the ignition is furnished by magneto and battery. The drive is by side chains and the transmission is planetary. Other features are semi-elliptic front springs and full elliptics in the rear, a positive force feed oiler and a wheelbase of 86 inches. The wheels are 36 by 3 inches and carry solid tires. The capacity of the car is 1,250 pounds.

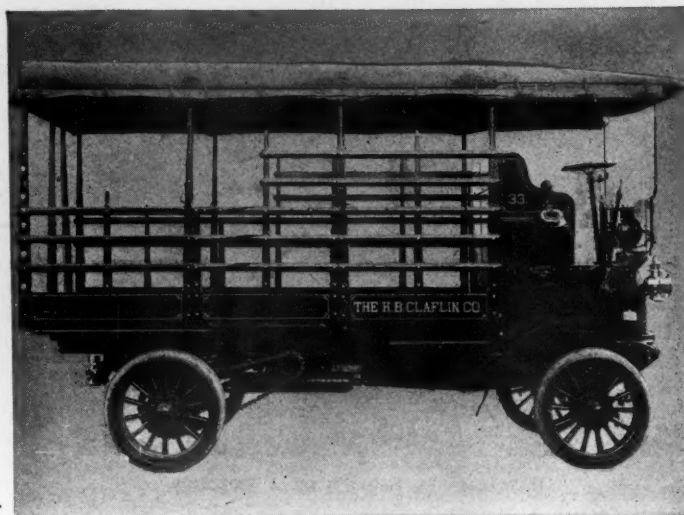
Martin—In the way of a commercial proposition the Martin Carriage Works, which is one of the newcomers, offers one chassis and the choice of one of several bodies—a commercial motor wagon with a panel top, an open-bodied machine and a six-passenger bus. It is a double-opposed four-cycle 18-horsepower proposition with a load capacity of 1,000 pounds. The two-cylinder motor is located under the front seats and partly under the floor and is of the pocket-valve type with a bore of $4\frac{1}{2}$ inches and a stroke of 5 inches. The cylinders are separately cast and it is demounted by the removal of five bolts. The lubrication is by means of a force feed lubricator and a gear pump and the oil is



MARTIN AS IT APPEARS FOR 1910



MAC K BROTHERS' 5-TON TRUCK



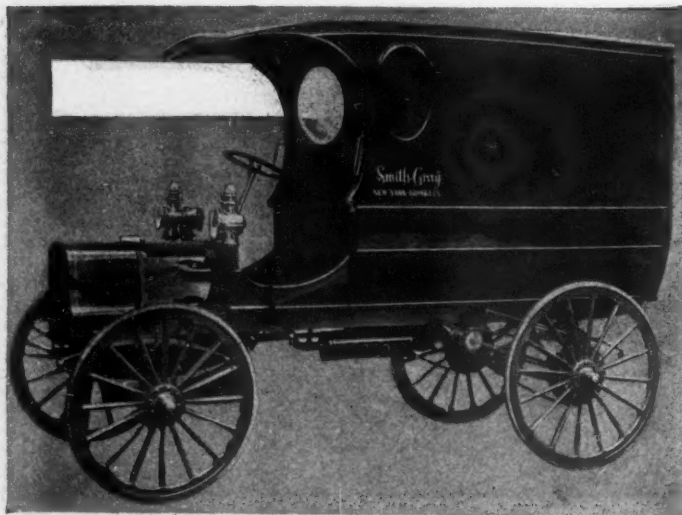
MAC K BROTHERS' 3-TON TRUCK

fed by pressure to the cylinders and the main bearings by means of external leads. No fan is used in the cooling system which is of the thermo-syphon principle, while the radiator is tubular, with air fins. A double system of ignition is used, there being a magneto and battery. The fuel feed is gravity and the carburetor of the float feed type. The clutch is a floating ring with a wood insert and the transmission is planetary and a unit with the motor. Double chain-drive is a feature of the transmission system. The crankshaft bearings, three in number, consist of one roller bearing and two plain ones. Roller bearings are in the front wheels. The wheelbase is 92 inches and the solid tires are 36 by 2½ inches.

Mack—Passenger buses and merchandise trucks make up the line of the Mack Brothers Motor Car Co., which has for 1910 a twenty-passenger cross-seat bus, a 5-ton brewery truck, a 5-ton merchandise truck and an eighteen-passenger closed bus. The Mack chassis is a four-cylinder four-cycle machine with the cylinders cast with the heads integral and in pairs and having a ¾-inch waterjacket. The bore is 5½ inches and the stroke 6 inches. The valves are on the same side and mechanically operated with a 2½-inch clear opening and a ½-inch stem. They are interchangeable. A high-tension Bosch magneto and a four-cylinder vibrating coil with a roller contact commutator are found in the ignition system. Two sets of plugs may be used. The Macks are particularly proud of their transmission scheme through having eliminated the sliding gear by using four positive clutches which makes possible gear-changing by means of a lever. In the lubrication system, which is of the force feed type, each bearing receives its oil through the hollow crankshaft from an indepen-

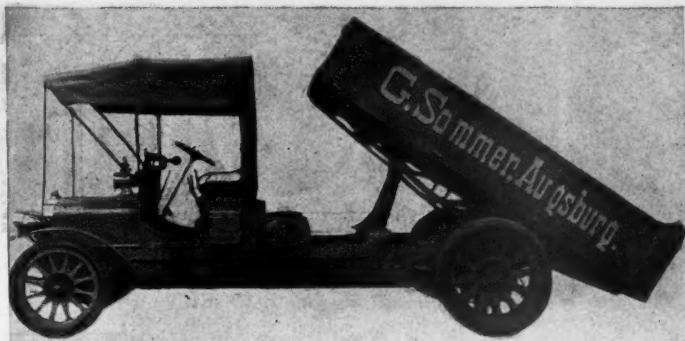
dent pump, all contained in one case, the pump being belt-driven. The radiator is of the honeycomb type and the clutch is conical and fiber-lined, there being pedal control, the clutch interlocking with the emergency brake. The steering is a Mack idea and patented and is of the screw-and-nut type. The wheelbase runs from 124 to 180 inches and the tread from 58 to 72. Novel in the passenger bus is the heating of it by means of the exhaust, there being a three-way cock by which the heat may be thrown on or off. The bus is equipped with electric push buttons and the interior is lighted by acetylene lamps.

Chase—As a commercial proposition the Chase is featured by the use of a valveless two-cycle air-cooled motor and high wheels fitted with solid tires. The model H is a wagon of 1,500 pounds capacity; the model C an open express wagon; model D another open express wagon of slightly higher price; model E a full panel top, while model F is a combination surrey and runabout. No startling changes have been made in the constructional features, and whatever alterations there are have been made with the idea of securing more graceful designs. The Chase motor is 20 horsepower, with a 4½-inch bore and 4-inch stroke, and is of the three-cylinder type. Planetary transmission is used and the drive is by side chains direct to the rear wheels. The oiling is the standard two-cycle idea, in which the oil is mixed with the gasoline and then fed to the motor in the form of a vapor. In the front full elliptic springs are used and in the rear platform. Ball bearings are used in the wheels, which also carry 2-inch solid rubber side-wire tires. The length of the body back of the dash is 10 feet in length by 48 inches in width, and the normal load capacity is 1,500 pounds.



CHASE, ONE OF AIR-COOLED VARIETY

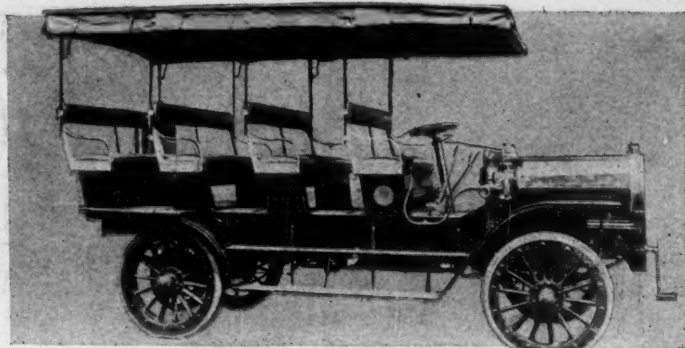
Reliance—Pressed steel frames no longer are used by the Reliance Motor Truck Co., which shows in its 1910 models a frame considerably heavier than before. The 5-ton truck in this line is built with a 7-inch open-hearth steel channel frame; the 3½-ton has 6-inch and the 2½-ton 5-inch, the steel being riveted with hot rivets. The size of the gusset plates has been materially increased and they are provided with a considerable number of openings to receive the bolts for fastening to the body, thereby avoiding the drilling of the channels for these body bolts. There is a material increase made in the length and size of the springs as well as in the size of the axles, wheel hubs and wheel bearings. The wheel bearings are of the Timken type, while hubs of the company's own design are used. The size of the driving chain has been increased by increasing the width and diameter of the rollers, but maintaining the same pitch as in former years—1¼, 1½ and 1¾. Formerly the seat was supported on a wooden structure, but now it is replaced by pressed steel seats which are heavily upholstered and carried on a support made of structural and pressed steel, no wood being used in them. No change has been made in the motor except the installation of a magneto high-tension ignition system and a separate jump spark vibrator



SAURER TRUCK WITH TILTING BODY

coil and storage battery system, the wiring for the ignition system being provided with slip terminals and wiring header, doing away with clamping screws. In the lubrication scheme the oil now is pumped through visible sight feeds to all the motor bearings, to every cylinder and to every crank pin. In this latter the oil is introduced through grooves turned in the crankshaft and counterweight or displacer and through a hole drilled from this groove to the center of the wristpin. A copper tube projecting into the groove, fed from the lubricator, supplies oil to this bearing. The size of the radiator has been materially increased, the radiator as before being suspended in an independent steel frame to avoid distortion of the frame. A centrifugal pump, which is located at the lowest point of the circulating system, replaces the old gear pump. The size of the transmission, which is a three-speed-forward affair, has been increased, as has the size of the gears, shafts and bearings. Alloy steel also is used in this part of the truck. The Hele-Shaw clutch has replaced the cone type.

Saurer—Albert T. Otto, who is showing the Saurer truck, is the importer of this Swiss commercial proposition and it is his boast that there practically are no changes in the car, the makers of which are standing pat on their product. As showing the standardization at which the Swiss has arrived, Mr. Otto points out that he is carrying in stock parts that are up to date now but which also can be used on trucks made several years ago. It is the intention to assemble the Saurer in this country next year, plans having been made to do the work at Plainfield, N. J., importing the motors and gearcases from the Saurer plant and using axles, springs, etc., from the same steel mills which supply the parent plant. The Saurer is a four-cylinder, four-cycle proposition and water-cooled. The inlet and exhaust valves are operated by camshafts which are placed on opposite sides of the engine, the valves being made of nickel steel and interchangeable. All gears are enclosed in a solid base of aluminum nickel as a protection against dust, while ball bearings are used on the crankshaft, fanshaft and camshafts. A high-tension magneto furnishes the ignition. The Saurer uses a two-nozzle carbureter,

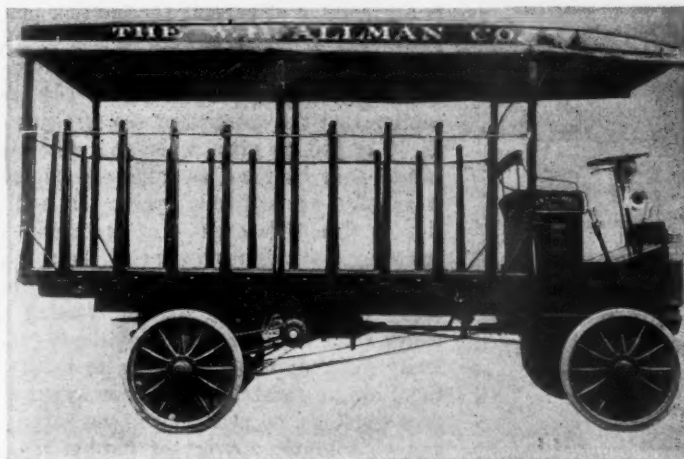


AMERICAN AS A SIGHT-SEEING BUS

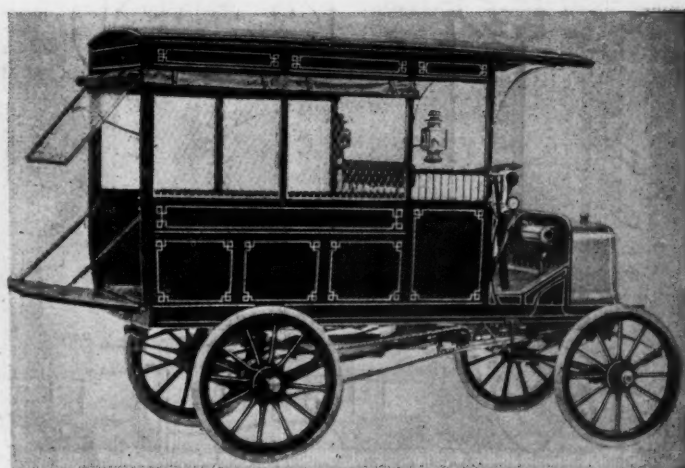
while the selective sliding gear gives four speeds forward. The frame is of cold pressed nickel steel with U-shaped side members which are reinforced by similar cross members. A feature is a non-skidding wheel of the Klingler type, which has a heavy cast-steel tire with sixty slots across the tread into which solid rubber blocks are inserted.

Gramm-Logan—The Gramm-Logan line is made up of a 25.6-horsepower delivery wagon of 2,200 pounds capacity, 28.9-horsepower truck of 3,000 pounds capacity and 36.1-horsepower truck of 1,000 pounds capacity, all of them having four-cylinder motors, and all the cylinders being cast in pairs. There is not much difference in the three types, all of which have tubular radiators, centrifugal water pumps, Splitdorf magnetos and storage batteries, disk-clutch progressive transmission, chain-drive and plain roller bearings. On the delivery wagon the tire sizes are 34 by 3-inch, while the other two use 36 by 3½-inch. The delivery wagon has a frame made of angle iron and the other two use channel. The delivery wagon wheelbase is 120 inches, the same as is found on the big truck, while the other truck has 124 inches. On the delivery wagon the motor has a bore and stroke 4 by 4-inch, on the light truck 4¼ by 5-inch and on the big 4¼ by 5-inch.

Hart-Kraft—Motor delivery vehicles with various types of bodies but with only one chassis make up the Hart-Kraft Motor Co.'s line for the coming season. In the enclosed body types the dimensions back of the seat are: Length, 60 inches; width, 45 inches; height, 58, on model B-3; 65, 48 and 50 on B-4; 78, 40 and 60 on 5-T, and 65, 48 and 60 on B-6. The wagon type, B-5, is 78 inches long back of the seat and has a width of 40 inches. Then there also is an eight-passenger hotel bus. The chassis carries a two-cylinder opposed motor with a bore of 4½ inches and a stroke of 4 inches, planetary transmission, and is fitted with a steel forged front axle and a nickel steel rear, while the frame is of wood, armored with steel. The lubricator is of compressed feed with dash sight feed, while a Splitdorf magneto, dash coil and dry cells make the ignition scheme. The wheels are 34 inches in diameter and carry 2½-inch solid tires front and rear.



GRAMM-LOGAN FITTED WITH STAKE BODY



HART-KRAFT, A LIGHT DELIVERY WAGON

ACCESSORY

YEAR by year the accessory department of the annual shows grows in importance. This year more makers are buying parts ready-made for their cars than they did last season. This year there are fewer car builders manufacturing their own carbureters than a year ago; the manufacturing of radiators by the car builders is practically ceasing, and in fact it is a recognized order of affairs for the best makers to purchase from the parts manufacturers as many parts as they possibly can.

In the accessory field improvement is evidenced on every hand and improvements are ever along the line of simplicity. The progress has been very general in all accessory departments. In the electric field the magneto situation has advanced by leaps and bounds, and more makers are in the field than heretofore. In the rubber realm the bringing out of anti-skid tires can be considered one of the big steps of the season. Hand in hand with it is the large landslide to the manufacture of demountable rims, which was but starting on its career a year ago. The demountable rim is now an assured fact, and in the course of two seasons it will be very general on many makes of cars.

One cannot overlook the progress of the year in the matter of windshields, these body accessories now being generally used

Electrical Apparatus

in every state in the union. These are now generally made with the tubular framework and nearly all are of the automatic design, in which the top half can be set at any desired angles without having to bother with thumbscrews, nuts or cotter pins. A marked improvement in these shields is along the line of so tilting the upper half that in rainy weather it serves as a porch.

Pittsfield Spark Coil Co.—This company exhibits its new type B high-tension magneto, of which Fig. 2 A is an end section and Fig. 2 B a side section. This magneto is of the strictly high-tension type, containing as it does a primary and secondary winding and has as its great characteristic the fact that both windings are stationary. The armature A, has two iron wings or sections, and the primary winding P and the secondary winding S are located at the rear end of the magneto where they are detachable in a few min-

utes' time, this accessibility being a feature of the winding. The armature driven in a four-cylinder four-cycle motor at crankshaft speed rotates between the ends of the magnets and has four poles, 1, 2, 3 and 4, so that there is a maximum current generated four times in each revolution instead of two. Two of the poles, namely 2 and 4, are in the regular magnetic field, and the other two, 1 and 3, are at 90 degrees to these. The primary winding is connected at one end to the field and at the other to a contact plate insulated by hard rubber bushings, and from which plate a wire connects with the contact piece of the breaker box. The high-tension winding is connected at one end to the primary, and the other end to a button on the coil whence it is led to the distributor segment. The primary winding has a few turns of heavy wire and the secondary many turns of fine wire. A special timing device allows of a variation of 45 degrees on the crankshaft in a motor of the four-cylinder four-cycle type. The condenser C is located at the end of the distributorshaft.

Witherbee Igniter Co.—The Wico Igniter is a generator of current for ignition purposes that produces a high-tension spark similar to that produced by the conventional high-tension magneto, with the exception that the strength of the spark produced is just as great when the motor is turned over by hand as when the engine is running at maximum speed. In addition to this, it is capable of producing a spark by a simple movement of the spark lever before the engine has begun to rotate at all, thus allowing of starting a motor from the seat. This igniter is radically different from the magneto in that there are no revolving armatures or armature windings, no primary coil, no battery and no vibrator. A set of flat-bar magnets, M, Fig. 1, always on a closed circuit, take the place of a storage battery; two

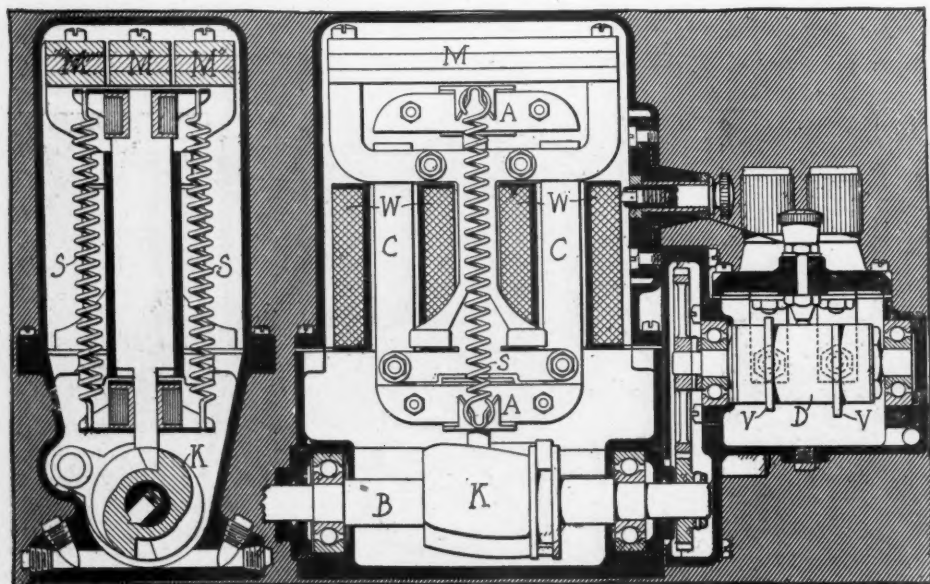


FIG. 1—SECTION 1910 WITHERBEE IGNITER FOR MOTOR CARS

DEPARTMENT

Magnetos

stationary coils W perform the duties of the usual spark coil; and a cam, K, usurps the function of a timer by causing a shaft or armature bar with armatures A attached, to vibrate with an up and down movement, alternately establishing and interrupting the magneto flux through the soft iron cores C around which the coils are wound, producing by induction a high-voltage current in the electric circuit which passes through the distributor, directly to the sparking plugs. This action takes place without varying the flow of magnetic lines through the permanent magnets and consequently has no demagnetizing effect on them. As the cam K rotates at crankshaft speed, one of its lobes passed under the armature bar, forcing it upward. As the bar rises two shoulders on its sides near the upper end come in contact with the under side of the top armature A, and thus forces it to rise also. As the bottom armature A at this time is in contact with the lower ends of the cores C and the springs S which connect the armatures have a tendency to draw them together, the upward motion of the armature bar and upper armature is opposed by the pull of the springs, and the springs at the same time hold the bottom armature in close contact with the lower ends of the cores. With the parts in this position, there is a free path for the magnetic lines from the permanent magnets to flow down from the north pole of the magnets at the left, let us say, through the adjacent pole pieces to the core, down through the core to the lower armature, across to the other core, and up through the second core and pole piece to the south pole of the magnets, thus completing the magnetic circuit. The upper armature at this time does not carry any of the magnetic lines because it is separated from the cores by air gaps of considerable width. Consequently it is many times easier for the magnetic lines

to follow the path above described. As the cam K continues to rotate, its edge passes clear of the armature bar and suddenly releases it. The tension of the springs pulling downward on the upper armature now causes the upper armature and the armature bar to move downward very rapidly until the motion of the upper armature is arrested by coming in contact with the cores. At this instant the shoulders on the armature bar near its lower end come in contact with the top of the bottom armature, which has remained stationary during the movement of the top armature, and a further movement of the armature bar, due to its momentum, carries the lower armature with it and away from the cores. The result of the combined action of the two armatures is that the magnetic circuit which previously existed through the portions of the cores, which are surrounded by the coils, is suddenly broken, and at the same time a

shunt path for the magnetic lines is provided through the upper armature and the small portions of the cores that project above the pole pieces. In this manner the magnetic flux through the portions of the cores that are surrounded by the coils is quickly and effectively reduced from maximum to zero and a single impulse of electro-motive-force generated in the coils, which causes a spark of great intensity to flow through the distributor D at the right, and through wires to the plug in the cylinder that is ready to fire.

Remy Electric Co.—There are two models of Remy low-tension magnetos for 1910—one the type S for two, four and six-cylinder cars with high-powered motors. This magneto is illustrated in Fig. 4 and has six permanent magnets. The other type P is for two and four-cylinder cars with small motors. It has four permanent magnets arranged in two pairs. Both of these types are of the same design, having an armature consisting of two steel inductors R mounted diametrically opposite on a shaft S which is rotated at half the crankshaft speed, and is gear-driven. There is but one winding W which is stationary. This is the primary winding and for the generation of the high-tension current a non-vibrating step-up transformer coil is provided and carried in a polished box on the

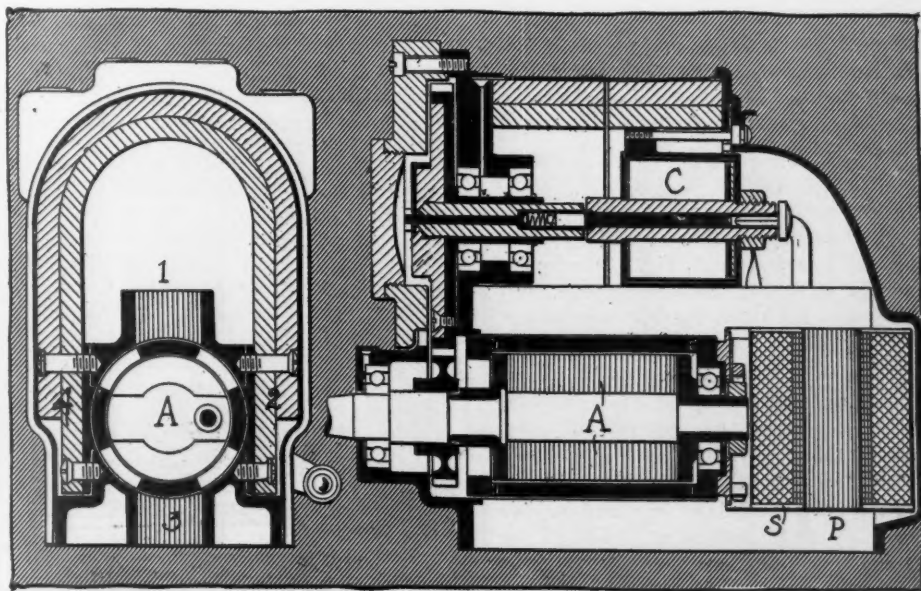


FIG. 2—A AND B, END AND SIDE SECTION OF PITTSFIELD MAGNETO

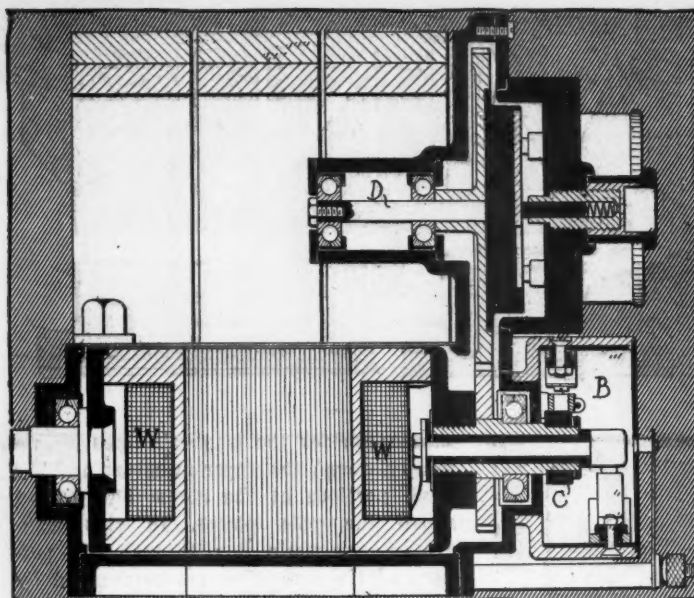


FIG. 3—SECTION OF SPLITDORF 1910 MAGNETO

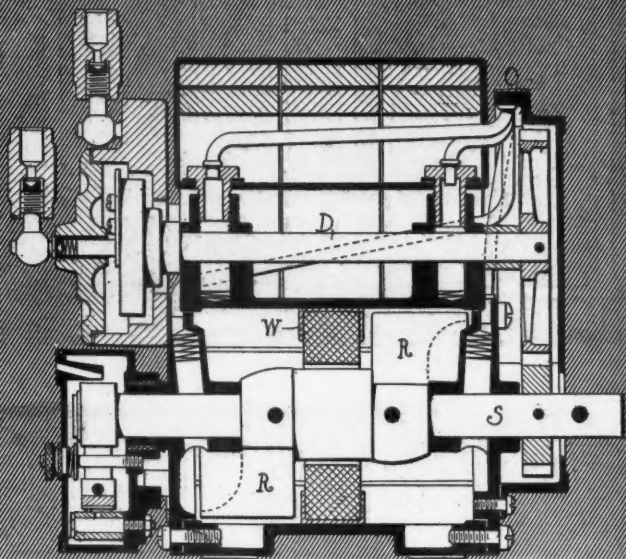


FIG. 4—SECTION NEW REMY 1910 MAGNETO

dash of the car. This transformer is equipped with a two-point switch for battery connection, thereby giving a dual system with one set of plugs. The distributorshaft D is gear-driven from the armature at half its speed, and carries the distributing disk on the rear end, to which the secondary current is conducted in the usual manner. Improved arrangements have been made so that the range of timing is increased a third. A noted improvement is that of the oiling system in which all of the oil tubes are carried to one point O at the top of the magneto, which is very accessible. These oil tubes are covered with a brass plate to keep out the dust and dirt. Plain bearings are used throughout on these magnetos. A self-starting device is used, consisting of a push button which makes and breaks the battery circuit, thereby producing a spark in the cylinder under compression. This device has been used for 3 years. A change in connection with the permanent magnets used is that they are shorter than heretofore, the open ends of the magnets not coming to the base of the pole pieces, Fig. 14, as formerly, but contacting only with the upper portion of these pieces.

Kokomo Electric Co.—This company shows for the first time its Kingston model A high-tension magneto for regular ignition work. This is a strictly high-tension magneto in that the shuttle type or H section armature A, Fig. 8, carries two windings—a primary winding of relatively coarse wire in which the low-tension current is generated, and a secondary winding insulated from and outside of the primary and consisting of many turns of fine wire. As in the majority of magnetos of this type the armature is driven at half crankshaft speed. The primary winding is grounded at one end to the armature and the other end leads to the interrupter or breaker box. One end of the secondary is grounded through the primary and the other is led to the dis-

tributor disk which is gear-driven from the armature shaft, there being a large gear G which carries the distributor disk and which rotates on a stationary stud. This magneto is characterized by the large diameter of the armature, for which the manufacturers claim results in producing an effective spark when driven at as slow as fifty revolutions per minute. The breaker box mechanism consists of a bell crank B, Fig. 20, with two arms at 90 degrees to each other. On the end of one arm is a platinum point P and the other end is arched shaped and contacts twice in each revolution with fiber rollers R placed at 180 degrees to each other on the spark advance ring. The armature is carried on two races of large sized Hess-Bright bearings, and the condenser is located between the breaker box and the rear armature bearings. Lubrication for the distributor box is through the oil duct L and thence through the drilled stud carrying the gear G. The distributor brush is a square section copper bar pressed out against the four segments that are wired to the spark plugs. This company also will exhibit its new switch of

hard rubber composition cover. It is arranged for use with battery and high or low-tension magnetos. The operating key is practically a Yale lock so that no key or apparatus of different design than the key intended for the lock will operate it.

Splitdorf Laboratory—Splitdorf magnetos for 1910 are all of the low-tension type in that the armature carries but a single winding in which is generated a comparatively low-tension current. This current is discharged through a step-up transformer coil having a low-tension and high-tension winding and this current is returned to the magneto distributor whence it passes to the spark plugs. The transformer coil generally is carried on the dash, but for those fastidious owners who want a clean dash a fireproof coil has been brought out which can be strapped to the frame of the car close to the magneto, thus avoiding unnecessary length of wire and making a switch the only part of the system carried on the dash. Splitdorf magnetos are made in three sizes for four-cylinder motors, two sizes for six-cylinder and two sizes for twin-cylinder types. These are alike in all respects as far as principle of operation is concerned. The rotating armature carries its single winding W and revolves on two races of annular bearings. The field, Fig. 3, consists of six permanent magnets arranged in three sets of two each. The distributorshaft is carried on a double race of ball bearings and is gear-driven from the armature. The primary current from a winding W is led to the breaker box B at the rear end where the current is broken twice in each revolution by two cams C on the end of the armatureshaft. From this breaker mechanism the current is led to the transformer coil. The company also has a transformer coil which in addition to using the current from the magneto takes the current from a battery, this current passing through the breaker mechanism of the magneto and being in turn dis-

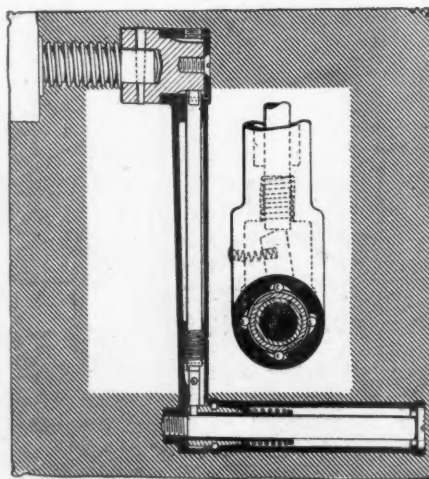


FIG. 5—HILTON SAFETY STARTING CRANK

tributed through the magneto distributor. This battery current can be used for starting or for emergency purposes.

Herz & Co.—The Herz magneto for next year is made in twelve different sizes, suitable for one, two, four and six-cylinder motors. Of this series six are new types with stronger design throughout and intended to give a hotter spark at lower speed. Ball bearings are used for carrying the armature and distributor shaft. One of these is illustrated in Fig. 7. It is for a four-cylinder motor and uses five permanent magnets, M, of the Herz disk type, these magnets not being of the conventional horseshoe shape, but so designed that the lower parts of the magnets form the pole pieces of the instrument. All Herz magnetos are high-tension types, the rotating armature carrying both primary and secondary windings, thereby eliminating a step-up transformer coil on the car dash. Like other magnetos, the Herz generates an alternating current with two maximum points in each revolution, the instrument armature revolving at camshaft speed. The contact-breaker, or breaker box, rides on the armature shaft at the rear and immediately in front of it is the condenser, G. A secondary distributor is gear-driven from the armature shaft, and a spark advance of from 40 to 50 degrees is possible. A safety gap is provided to protect the armature winding should the voltage exceed the maximum which this winding is intended to stand.

Hayes Mfg. Co.—Sheet metal parts and forgings made up into useful articles for motorists comprise the display of the Hayes company, of Detroit. Particularly noteworthy is the line of metal tool and battery boxes, Fig. 6, which have pressed covers and round corners and which also are useful in that they can be used for steps. Points of superiority over the old wooden box are claimed in that vibration, washing, weather and mud do not injure the metal box. As an extra, an iron ledge for

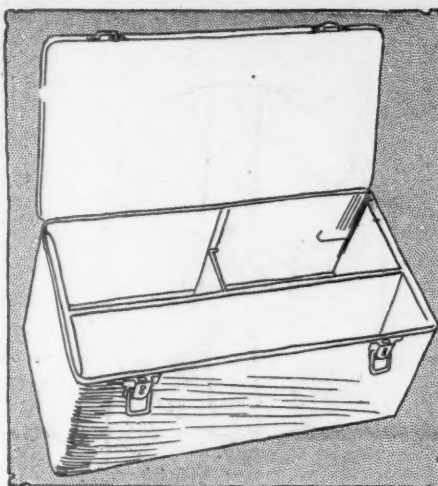


FIG. 6—HAYES METAL TOOL BOX

trays is offered and in the way of a lock there is a brass suitcase bolt and lock which can be fitted at a slight extra cost. A garage floor pan, made of 18-gauge steel is offered, the size being 34 inches in length and 24 inches in width.

Geiszler Brothers' Storage Battery Co.—This exhibit includes ignition batteries, lighting batteries, vehicle batteries, etc. The Geiszler ignition batteries are made in all sizes and provided with the improved non-corroding terminals. The lighting batteries are put up in wooden boxes and their capacity is rated on a 5-ampere discharge basis. They are specially adapted for lighting, being rated high enough to carry the full lamp equipment without reducing the ampere-hour capacity. The Midget battery, in which the plates are adapted to fit cylindrical hard rubber jars, is of 2-volt 30-ampere hour capacity, and by connecting any number of them any voltage may be obtained. They are made with a semi-dry instead of liquid electrolyte and can be used in any position, there being no danger of leaking. The Geiszler vehicle battery is shown for the first time, and they are guaranteed to be non-sulphat-

ing under all conditions. Another part of the exhibit is the Geiszler Albino lamp, which consists of a thin spring-brass plate on which a socket for a miniature electric lamp is mounted, and provided with a fine cupped reflector. The flat back plate is slotted at each end and a loop of flat rubber elastic attached to each end, so that in service the back plate fits smoothly against a man's forehead and the elastic passing around the head holds it in position. A double lamp cord extends from the lamp to the storage battery on the car.

Hilton Mfg. Co.—This booth contains as its leading exhibit the 1910 model of the Hilton safety starting device, Fig. 5. It is a starting crank designed to prevent injury from the back kick in cranking a car. This is made possible in that the offset of the crank fits to a bracket which is furnished with four cams. A plunger serves to lock the arm of the crank when turning in the cranking direction, but should a back kick occur this plunger contacts with the rounded face of the cams and thus frees the arm of the crank from the end of the crankshaft. The handle is secured to the arm through a clutching mechanism consisting of four balls which operate in slots in the handle tubing.

Lavelette & Co.—As in 1909, so for next year. This concern will market two types of Eisemann magneto, one a high-tension instrument, Fig. 15, in which there is a primary and also a secondary winding on the armature, whereas in the other type, a low-tension design, the armature carries but a primary winding and a step-up transformer coil is needed to produce the high-tension current, the coil being located on the dash or other convenient place. Excepting in this respect, the general design is alike. Both employ helicoidal-shaped pole pieces by means of which, when the revolving armature is leaving or meeting them, the magnetic flux or lines of force is progressively broken and re-established. These types of pole pieces have been used

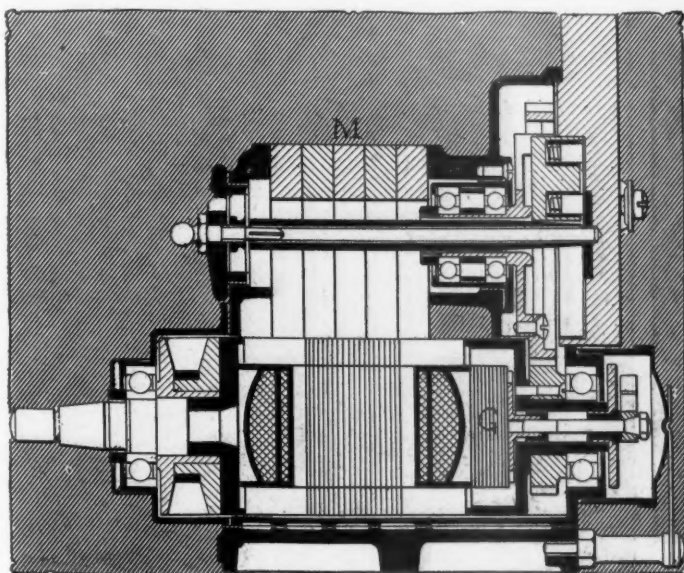


FIG. 7—SECTION HERZ 1910 MAGNETO

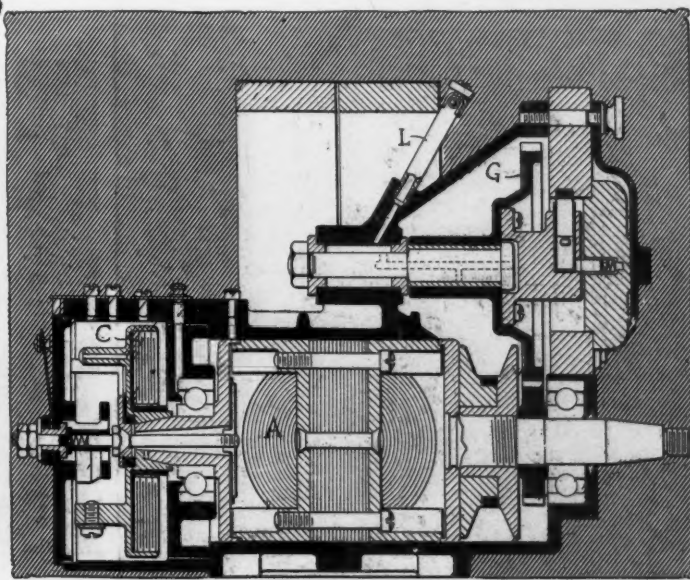


FIG. 8—SECTION OF NEW KINGSTON MAGNETO

during the present season. The armature consists of laminations of soft iron insulated from one another by shellac in order to prevent any currents among the iron pieces. A thirty-five-degree spark advance is possible by shifting the steel shoes on which the fiber block of the breaker lever kicks, which range of advance, it is claimed, is obtained without decreasing perceptibly the intensity of the spark. In the high-tension instrument the armature is carried on ball bearings at the rear end and on the plain bearing on the driving end. This company has a dual ignition scheme which permits of starting the motor from the seat. It consists of a type E-K magneto and a non-vibrator dash coil in combination with a high and low-tension switch. In this magneto the make-and-break mechanism and the high-tension distributor serve for the magneto and the coil, the distributor being positively connected to the make-and-break mechanism so that both are advanced and retarded in unison. The armature is of the double T type and the starting coil on the dash includes a stationary induction coil with condenser for increasing the voltage of the battery. The switch carries the high and low-tension currents at the same time.

J. S. Bretz Co.—This concern shows a complete line of German-made magnetos, all of which are characterized by the use of ball bearings throughout, special bearings of this type carrying the armature shaft. The U. & H. magnetos are listed in nine sizes for the coming season. Two of these are fitted with the self-starting device, Fig. 11, which was shown a year ago; one is for a dual system of ignition, Fig. 10; one specially designed for four-cylinder motors under 24 horsepower; and another for three, four, six or eight-cylinder motors with bore not exceeding $4\frac{1}{2}$ inches. In addition there is a line for single-cylinder motors, one for two-cylinder motors, one for single-cylinder motor cycles, and another for two-cylinder motor cycles. All

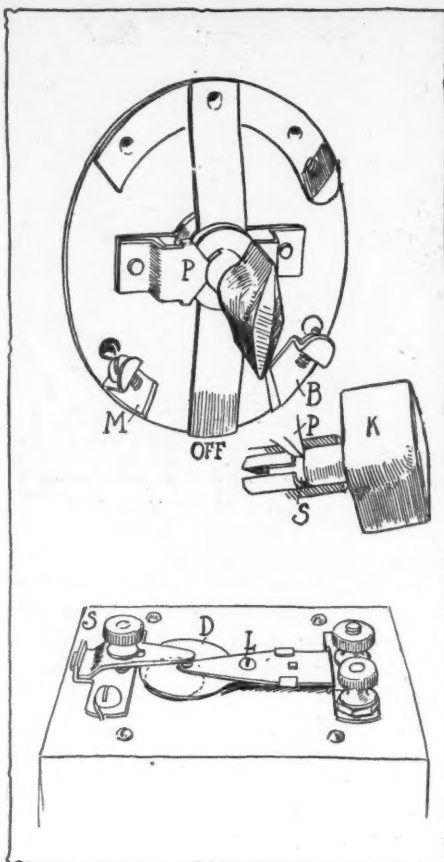


FIG. 9—OSBURN ELECTRIC SWITCH AND VIBRATOR

U. & H. magnetos are of the high-tension type, the shuttle type of armature carrying two windings, a primary and a secondary, so that the step-up coil on the dash is not required. One of the features of these magnetos is the master interrupter in the primary or low-tension circuit. The interrupter blade, or arm, has a broad, curved face, which comes in contact with a pair of cams located oppositely on the breaker-box cover, these cams with the cover plate being rocked to vary the timing of the spark. The magneto is furnished with a safety gap in the high-tension

circuit, which protects the armature in case some of the wiring to the plugs becomes disconnected. The condenser consists of a series of circular sheets or disks of tinfoil located side by side, each disk being isolated from the adjacent ones by a sheet of mica. The condenser complete is mounted in a circular casing on the armature and revolves with it, by means of which arrangement all moving contacts and wire connections are eliminated. The distributor uses hard rubber insulation.

Osburn Electric Co.—Spark coils for one, two, three, four and six and any number of cylinders are shown by this concern. A few changes have been made in these coils for next year; all wiring in the coil box has been eliminated, buss bars being used instead. An important alteration in the principle of the vibrator, Fig. 9, is used so that before leaving the factory each unit may be adjusted to draw the same amount of current and have the same frequency of vibration. The vibrator is a disk D which clamps to a leaf spring L. By means of an adjusting screw S the desired result is obtained. Osburn coils are also fitted with a new switch, in which the key K cannot be withdrawn when the switch is on the magneto or battery, but only when in neutral as illustrated. This is due to a circular slot S in the key stem and a vertical slot at right angles to it. When the switch is in the off position the key can be inserted or withdrawn in that the locking point P coincides with the vertical slot, but as soon as the switch is on the magneto or battery the point P enters the circular slot S and the withdrawal of the key is prevented.

Heinze Electric Co.—The leading exhibit in this booth is the new Heinze magneto of the low-tension type with which a step-up coil on the dash is used. Externally, the magneto is quite different from heretofore in that the magnets of the horseshoe type are circular in cross

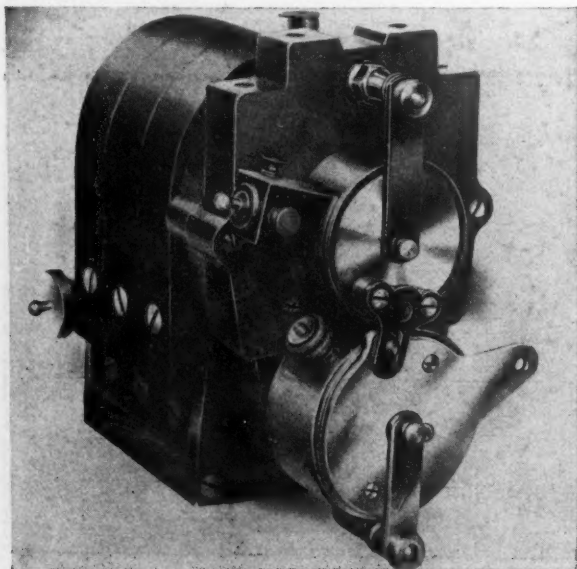


FIG. 10—U. & H. MAGNETO FOR DUAL IGNITION SYSTEM

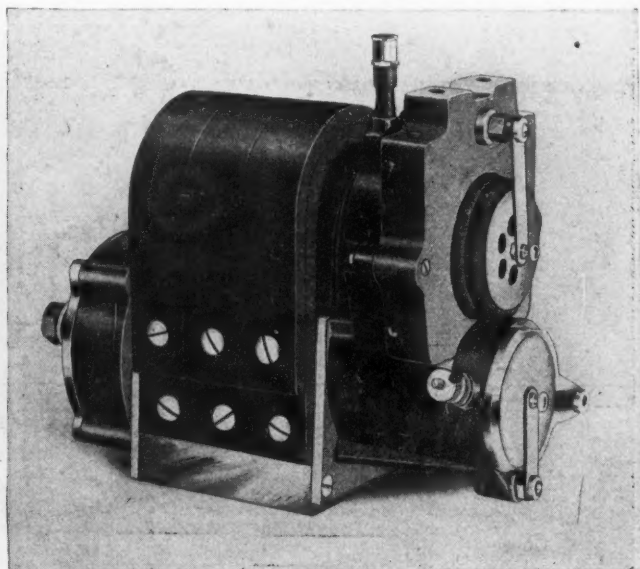


FIG. 11—U. & H. MAGNETO WITH SELF-STARTER

section instead of rectangular. Before bending, these magnets are round rods rather than flat strips. The ends of these magnets are ground to a uniform taper, which tapers exactly coincide with holes in the pole pieces. The magnet ends are forced into these holes under pressure. This construction places the entire lower end of the magnet in contact with the pole piece, whereas with flat magnets only one side is in contact with the pole pieces. On the Heinze magneto, cast iron pole pieces are used. The armature core is cast iron instead of laminations. Roughly speaking, this armature is of the shuttle type, but the slots are more shallow than usual, leaving the main body of the core of larger section. The armature horns are not so abrupt but more stocky, this design being used to reduce reluctance of the armature core. The winding on this armature contains but a fraction of the usual number of turns, which is due to the fact that it is claimed to cut at each rotation a greater number of lines of magnetic force between the poles of the magnets.

High Frequency Coil Co.—This concern has the Seeley ignition system as well as the Seeley duplex magneto. The 1910 system is identical with that shown a year ago. This system uses magnetos, storage cells or dry cells as current producers. The electric current in these sources is led to a non vibrator coil with condenser in parallel. From this the current goes through a single wire to a roller type of commutator on the motor, from which commutator four wires lead to the resonators on the cylinders, one resonator for each plug. One of these is illustrated in Fig. 12. Each resonator is a cylindrical fiber case chamber 2 inches diameter and 1 inch long. Within each are two windings, a primary of three turns, and a secondary of many. From this secondary winding a spring connects with the spark plug. The theory of this system is that when the timer makes contact the primary coil on the dash

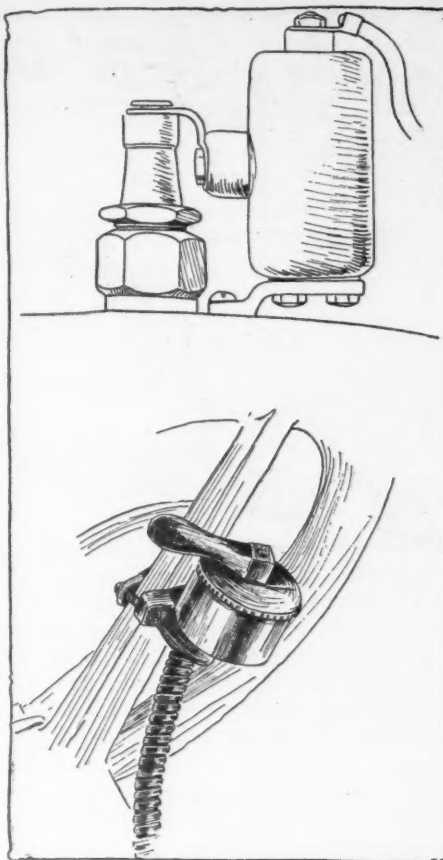


FIG. 12—ATTACHMENT OF SEELEY RESONATORS
FIG. 13—CONNECTICUT WHEEL SWITCH

is saturated and when the break comes this charges the condenser, which discharges through the timer and into the primary of the resonator, and immediately the induced high voltage current in the secondary winding of the resonator bridges the spark plug gap.

New York Coil Co.—A practical demonstration of a four-cylinder coil is made. It is shown running on a Wheeler & Schebler magneto and in addition there is a switchboard which permits of switching from the magneto to the battery current. Also there is a single-cylinder coil working

on a distributor from a battery current. A smaller switchboard shows a non-vibrating coil working with a mechanical interrupter.

Westinghouse Companies—The Westinghouse Electric and Mfg. Co. and the Westinghouse Storage Battery Co. made a joint exhibit, showing three distinct lines—motors, mercury rectifier charging outfits and vehicle and sparking batteries. The Westinghouse mercury rectifier outfit converts the alternating currents of the service wires into direct currents for charging the batteries. With this equipment, it is only necessary to insert the charging plug, start the rectifier and adjust the rate of charge, which continues until the cells are fully replenished and then automatically disconnects itself. In case the supply voltage should be interrupted, the rectifier will automatically start again when the power supply is restored. The Westinghouse storage battery is shown in both standard and high-capacity types for use on motor cars.

United States Light and Heating Co.—This exhibit is National sparking batteries. A full and complete line for electric vehicle work. This concern has introduced battery plates of medium thickness, which are designated CBH and WBH plates. The company also exhibits its CBT and WBT plates, which are the thinnest introduced by this company. Its new high bridge jars are shown for the first time.

Lutz-Lockwood Mfg. Co.—In addition to its S X dry cells, this concern shows the S X magneto of the low-tension type, which operates through a step-up transformer coil on the dash. It has four permanent magnets arranged in groups of two, which are of the conventional horse-shoe type. The transformer coil is made of two units, having four terminals for connection to the plug. By the system of high-tension distribution two spark plugs are operated in series, thereby giving a spark in each cylinder, at the end of

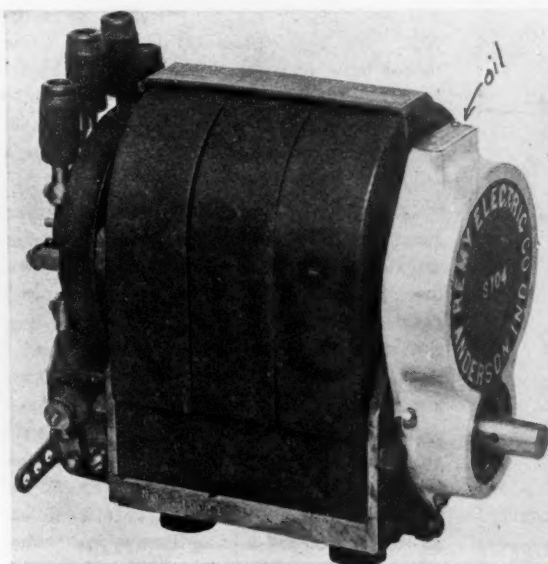


FIG. 14—REMY 1910 MAGNETO

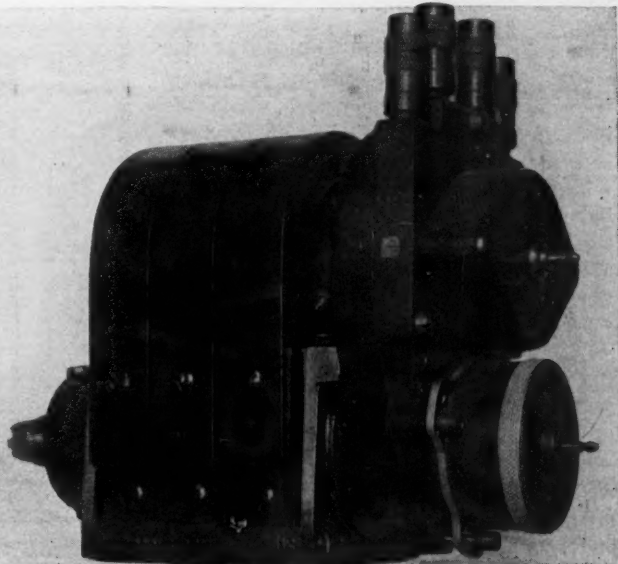


FIG. 15—EISEMANN 1910 MAGNETO

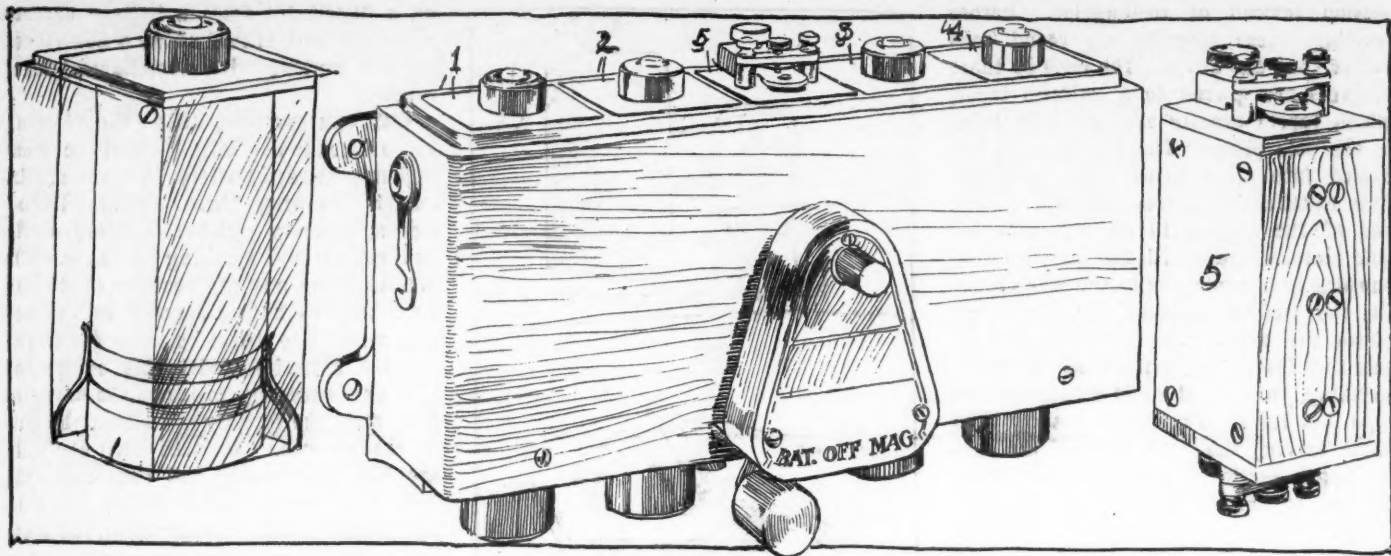


FIG. 16—CONNECTICUT MASTER VIBRATOR COIL, ONE UNIT AND MASTER VIBRATOR UNIT

the compression stroke and at the end of the exhaust stroke. This spark in the exhaust cylinder is claimed to clean the points of the spark plug in that cylinder as well as intensifying the spark in the cylinder under compression.

Electric Storage Battery Co.—The exhibit of this concern consists as usual of Exide batteries suitable for pleasure vehicles, Exide sparking batteries for ignition purposes, and Exide lighting batteries used by the Packard company. The capacity of the lighting battery is 50-ampere hours and is used on Packard cars for lighting the dome of the limousines. No radical change has been made in the makeup of the vehicle or sparking batteries.

Dayton Engineering Laboratories Co.—A novelty in ignition circles used by some makers this year and on the market for next season, is the Delco, illustrated graphically in Fig. 19. This system comprises three units, the coil box, B, a controlling relay, R, and a switch, S, in addition to which are the set of dry cells, D, and the timer, T, on the motor. The coil box, B, contains four non-vibrating induction coils, one for each cylinder of the motor. These units or coils are embedded in a heat-resisting compound which allows of carrying the coil box on brackets on the motor instead of on the dash. The relay, R, is merely a master vibrator which is wired in the circuit of the timer, and the four primary windings of the coil units. It is the master vibrator of the entire system. It differs from the regular vibrator, however, in that it opens the primary circuit but once for each contact of the timer, and it is this single spark for each timer contact that makes it possible to use dry cells as the current source instead of storage cells. The switch, S, is made entirely of metal, the springs being tempered German silver, the contacts meteor steel. Connections are made by a cam movement. The switch cover is fastened from the back, making it impera-

tive to remove the switch bodily before it can be tampered with. It has a lock and key as protection against theft. The controlling relay, Fig. 17, has a coil, C, and has two windings, a primary and a secondary. The electric current, when the timer makes contact, passing through the primary winding, pulls the armature, A, down, separating the contact points, P, and opening the circuit. Immediately this is done the armature, A, would lift to its first position, making contact again and breaking it, as in the conventional vibrator, were it not for a second fine winding wound on the coil, C, but shunted around at S, which holds the armature, A, against the pole piece until the timer passes out of contact, at which time this shunt circuit is broken, releasing the armature and allowing the points, P, to come together and be in readiness to break the circuit when the timer reaches its next contact. This explains the one spark for

each contact made by the timer segment.

E. R. Mosler & Co.—A complete line of electrical apparatus constitutes the exhibit of this concern, among which might be noted Splitfire spark plugs, Triumph and Beat-'em-All open end spark plugs, Umph timers and distributors, Mosler roller timers and distributors, self-snap controlling levers and cut-out levers, Isti rear signals, and MB carbureters, these being the latest design of George A. Breeze. The Triumph spark plug has been made for 3 years and besides being of the open type, uses porcelain insulation. The B-M-A, or Beat-'em-All plug, is a separateable type, using mica insulation, and the metal base has an exceptionally deep chamber. The insulation is removable and readily accessible. By unscrewing the brass cap, with the plug located in the cylinder, the entire core may be taken out, allowing of cleaning the insulation. The Umph timer is a double ball-bearing type and is made for one, two, three or four-cylinder motors. The revolving contact is a roller.

Union Battery Co.—This concern shows its line of dry cells and flashlights of various types. Its No. 6 cells, 6 inches high and 2½ inches in diameter, is for motor cars and motor boats. Its capacity is 34 amperes and 1.6 volts. The No. 5 dry cell is for motor cycles. It is 2 inches in diameter, 5 inches long, and has a capacity of 25 to 28 amperes.

United Manufacturers, Inc.—A departure for this year in the Connecticut electrical line is the new master vibrator system, Fig. 16, in which the coil box for a four-cylinder motor is located in the center of the illustration. This box contains five units, four of which, 1, 2, 3 and 4, are non-vibrator units, one for each of the cylinders, whereas as the fifth or central unit carries a master vibrator which does the interrupting of the primary circuit for all four units. This No. 5 unit is shown at the right end of the illustration which discloses that it is in reality a double vibrator coil, with a vibrator on the top

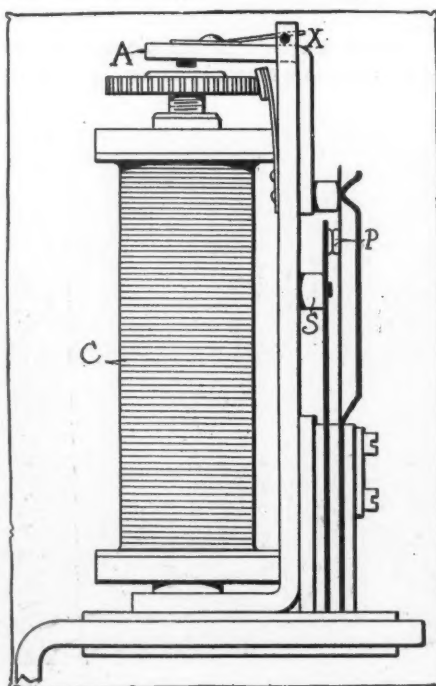


FIG. 17—DELCO CONTROLLING RELAY

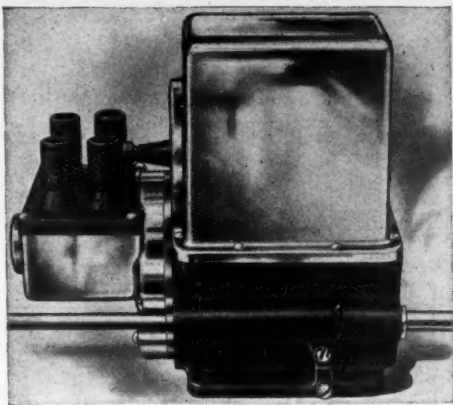


FIG. 18—THE WITHERBEE IGNITER

and another on the bottom. The units contain two separate coils and two vibrators, so that should one become disabled the unit may be pulled out and turned end for end when the other master vibrator is brought into action. At the left end of the group is shown one of the four non-vibrating units used. The body of these is round, with two bands around them near the base, these bands being the connections with the primary and secondary windings, so that when the unit is dropped into place in the coil, leaf springs, which are shown, automatically establish connection with these units irrespective as to how they are dropped into place.

Vesta Accumulator Co.—A full line of electric lamps and headlights, as well as batteries for lighting and sparking purposes are shown. A specialty is being made for batteries for lighting purposes, which is furnished in two sizes—6-volt 80-ampere and 6 volts of 160 amperes. The line of lamps shows headlights fitted with Tungsten bulbs and rear lamps, as well as the usual line of domes for limousines. Shown for the first time is the Vesta magneto of the low-tension type, generating an alternating current, which is high-tension in a transformer coil on the dash. The armature shaft is carried on ball bearings. The circuit breaker is operated by a hardened steel cam. The transformer coil on the dash is pancake wound and so arranged that a 6-volt storage battery can be operated on one side without injury to the coil. A push button is provided, which allows starting the motor without cranking.

Motsinger Device Mfg. Co.—The novelty in this exhibit is the D C magneto, an entirely new machine for primary ignition only. It is driven by a friction governor pulley and operates in either direction. The auto-sparker has been somewhat improved, giving a slightly greater amperage output than this year. It is suited for charging 6-volt storage cells, as well as for lighting purposes. It is capable of carrying a load of 6 Tungsten lamps of the 6-volt, 1/2-ampere capacity. The new Faultless plug switch is exhibited.

Atwater Kent Mfg. Works—This concern shows its usual interesting line of

electric apparatus, which includes the Atwater Kent spark generator ignition scheme, that has been on the market for years, and in which dry cells constitute the electric source. The leading feature of this device is its great economy in that it makes only one spark for each ignition, whereas with the vibrator coil six or eight sparks are made. This greatly conserves the current source. The company also shows its Unisparker, which is a simplified form of the spark generator, and consists of a contact maker, distributor, non-vibrating coil, condenser and switch. The contact maker and distributor are placed on a camshaft and the spark coil and condenser on the dash. The company also has a line of pocket ammeters and volt-ammeters.

National Carbon Co.—The Columbia multiple batteries made by this concern are said to differ from others in that they require no charging, contain no acid, will not slop or spill and are water and weather-proof. The feature of these batteries is that notice of their approaching exhaustion is given from 100 to 200 miles in advance.

Union Battery Co.—Dry cells and flash lights make up this display. The Nue cell, it is said, can stand on a shelf for several months without noticeable depreciation in strength. The Union dry cell is put up in square cartons which make it convenient for packing in battery boxes and prevent the cells from shifting and turning. The Union ammeter has an etched metal dial which it is claimed is not affected by heat, cold or moisture and which can be read up to 50 amperes. It can be used with or without the wire cord.

New York Coil Co.—This concern exhibits spark coils running on a battery and low-tension magneto.

Bosch Magneto Co.—The magneto exhibit by this concern includes twenty-five typical examples of high-tension magnetos suitable for motors with one, two, three, four, six and eight cylinders, together with five types of low-tension magnetos which operate in conjunction with the Bosch mag-

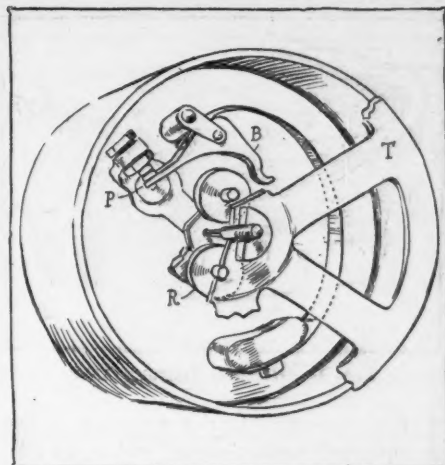


FIG. 20—KINGSTON BREAKER BOX

netic plug, as well as several low-tension types adapted for motor cars using the make-and-break spark, or for motor boats and stationary engines. This line is most complete in every respect, and to it could be added specially designed instruments for one, two and four-cylinder motor cycles. In addition to this the Bosch dual ignition system is shown, including one new form of this system which is exhibited for the first time in America. One of the magnetic plug systems is shown in operation. Some changes have been made in some of the magneto types. In the D U series, for one, two and three-cylinder motors, the terminals are located on the face of the distributor plates instead of at the top, which is usual with Bosch magnetos of this type. The company is marketing a new horizontal sparking coil for the dual ignition system, which coil is capable of being so set in the dash that only the switch appears.

C. A. Shaler Co.—The Shaler company is again to the fore with the Shaler vulcanizers, which have found a good market and which interest the private owner and garage man alike. They now are made in sizes for vulcanizing motor cycle tires. Also the Shaler electric city vulcanizers have an automatic heat control and are made in two models—for private use and for daily garage use.

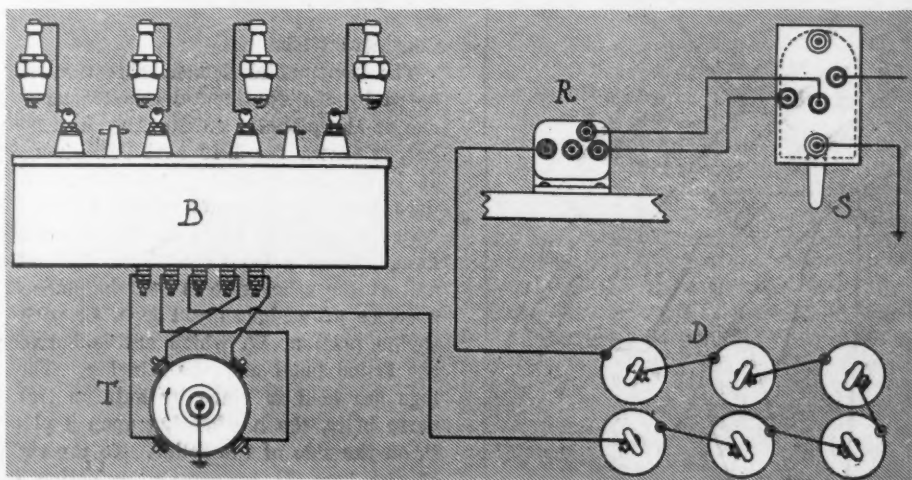


FIG. 19—WIRING DIAGRAM OF DELCO IGNITION SYSTEM

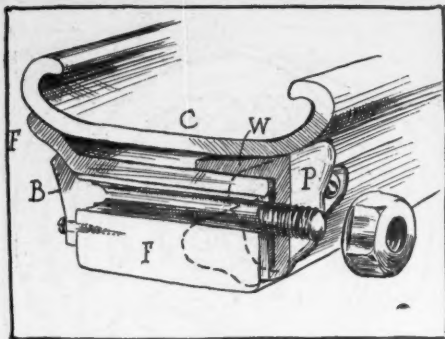


FIG. 1—DIAMOND DEMOUNTABLE

THE demountable rim progress is one of the characteristic moves of the year. At the last palace show few of the big American concerns showed their own rims of this type, but since then several of the big makers either have brought out rims of their own development or have purchased patented rims from outside parties. In the demountable rim field at present there are two big or master divisions—the split rim field and the non-split field. By split rim is meant that the rim is cut crosswise from side to side at one point, which allows it to expand so that it readily can be slipped onto the wheel felloe and after it is on, by turnbuckle or other means, it can be drawn tightly onto the felloe and locked thereon. In the non-split rim the favorite method of attachment is by the transverse bolt, in which a series of four, five, six or eight bolts pass transversely through the felloe of the wheel and engage either radial lugs on the demountable rim or else separate lugs or a ring which bears upon the rim and holds it in place. A third class is the radial shoe type, in which a series of three

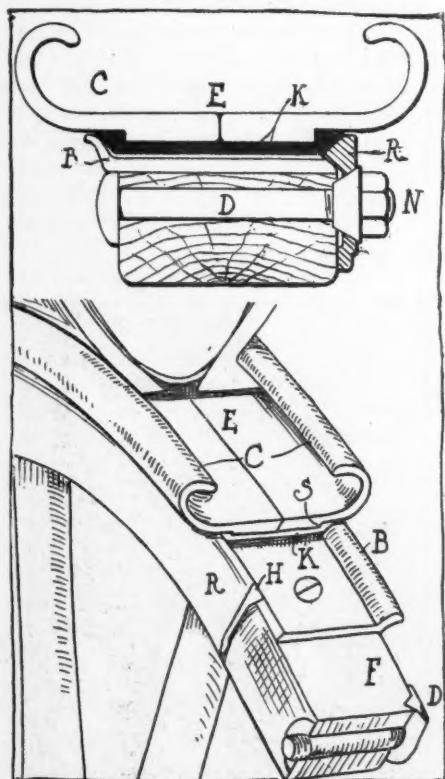


FIG. 2—NADALL DEMOUNTABLE

Demountable Rims

or more locking radial shoes are contained within the wheel felloe and are forced outward into slots milled on the internal face of the demountable rim, thus locking it in position. At present the transverse-bolt class with the non-split rim is in the majority, in a more than two-to-one ratio.

Needs of the Times

Undoubtedly the biggest demand at the present time that is being brought to bear on the makers of demountable rims is that for a demountable which also has a quick-detachable side ring or takes a quick-detachable tire. Users of cars have realized that it is good to be able to change quickly the tire in case of puncture, and it is doubly good to be able to make a hurried replacement of a punctured casing from a rim after it has been removed from the car. There are only a few makes of rims at present on the market which contain this happy combination, but it is practically a safe prediction to make that the ultimate rim will be one for a quick detachable tire. Those demountable rims of the non-split-rim type will be considered first.

The new rim of the Diamond Rubber Co. is a departure from that shown by this concern a year ago. Fig. 1 illustrates it in perspective, the wood felloe, F, of the wheel carrying a steel band with a single flange, F, on the inside of the wheel, leaving the outside of this band free to slip the demountable clincher rim, C, on into place. A series of plates, P, are held to the outside of the felloe by the transverse bolts, B, and each plate has a wedge projection, W, which enters between the steel rim, F, and the clincher, C. As the nut is tightened on the bolt, B, the demountable rim, C, is rigidly locked in position.

Continental Rim

The Continental demountable rim, marketed by the Continental Caoutchouc Co., one of the pioneers on the American market, is shown in Fig. 10, taking as it does only the clincher type of rim, C, which at one side bears upon a permanent flange, F, on a band shrunk on the felloe and at the other side is held in place by a series of wedge-shaped lugs, L, with a wedge portion, W, which enters between the felloe band and the clincher. These lugs are held in place by nuts on transverse bolts, the lug bearing upon a plate, P, on the side of the felloe. To the right of the lugs, L, appears a projection on the under side of the clincher rim, resting

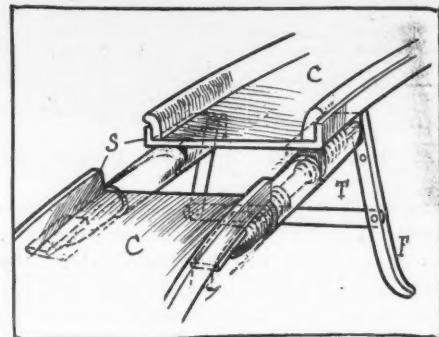


FIG. 3—GOODYEAR'S DOOLITTLE DEMOUNTABLE

in a recess in the felloe, which prevents circumferential movement of the rim. There is a series of eight of the lugs, L, regulating space around the circumference of the wheel.

The Michelin demountable, made by the Michelin Tire Co., has been on the American market for a long time and is of the transverse-bolt type and is suited for clincher rims only. As shown in Fig. 8, the clincher, C, is retained by a series of lugs, L, with a curved tip resting against the clincher, a wedge, W, which inserts between the wheel felloe and the rim, C, and the wheel portion, H, which rests against the side of the felloe. Tightening the nuts on the transverse bolts, B, enters the wedge, W, which at the same time tightens the rim, C, in place. To the right of the lug, L, appear means for preventing the circumferential slip on the rim, C.

Fisk Demountable

The Fisk demountable, Fig. 7, has been on the market for several seasons and was designed specially for the Fisk mechanically-attached tire, made by the Fisk Rubber Co. The wheel felloe, F, carries a deep band, B, which a cone face on the outside, against which the correspondingly coned face of a continuous ring, L, contacts. The rim, R, carrying the tire has a central depression, D, which at one side rests against a shoulder on the band, B,

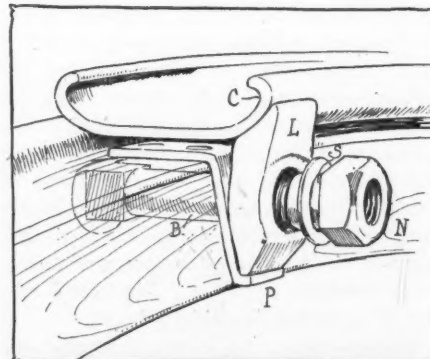


FIG. 4—EMPIRE DEMOUNTABLE

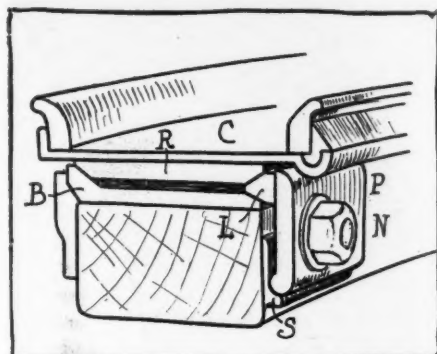
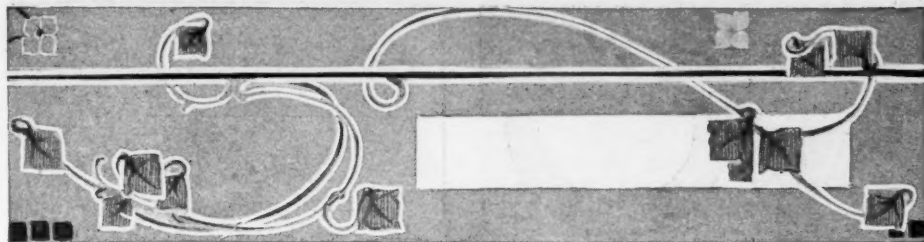


FIG. 5—FIRESTONE DEMOUNTABLE RIM

and at the other side engages with a corresponding shoulder on the ring, L. In removing this demountable the nuts on the cross bolts through the felloe are removed, after which the ring, L, falls off and the rim, R, with the tire is free to be removed to the side. Provision is made to prevent any circumferential slip of the rim, C, on the felloe. The valves on tires used on these rims do not pass radially through the felloe but come out to the side of the rim, R.

In the class of non-split demountables suitable for clincher or quick detachable tires there are a couple of examples. One is the new Nadall, made by the Nadall-Van Sicklen Co., Chicago. This rim, Fig. 2, is illustrated with a Nadall type of quick detachable scheme which has proven particularly successful during the past fall. The demountable feature will first be explained. The wood felloe, F, has shrunk onto it a band, B, with a permanent flange on the inside and no flange on the outside. The rim, C, carrying the tire rests against this flange and is held in place by a split ring, R, which is held in place by a series of cross bolts, D, and nuts, N, the inner face of which are cone-shaped, so that as the nut is tightened into place with the usual offset wrench the ring, R, riding on the cone faces of the nuts, is expanded, so that its face, H, a 45-degree angle, carries the rim, C, tight against the opposite flange on the band, B, thus anchoring it in position. The quick-detachable feature

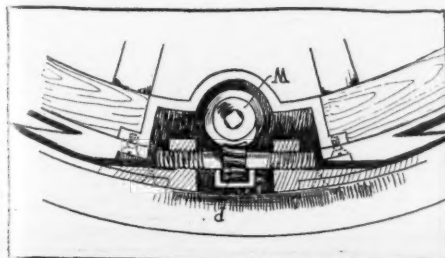


FIG. 6—HOWARD DEMOUNTABLE RIM

of the rim, C, is specially novel. The rim, C, is circumferentially split in the center at E and can be separated into halves. The base of this rim is thicker than the curved side portions and has shoulders, S, which fit into a groove in a spring steel band, K, which holds the halves of the rim, C, rigidly together. The band, K, is split transversely at the point where the valve stem comes and the inherent spring of the band holds it in against the shoulders, S, on the clincher. When seen on a car it is impossible to detect the quick-detachable feature of the rim, C.

Empire Demountable

The new demountable of the Empire Tire Co. was brought out during the past fall and is shown in Fig. 4. It is of the transverse-bolt type, a series of bolts, B, passing through the felloe and taking lugs, L, which have a curved face to rest against the clincher rim, C. Each lug at its base rests on a shoulder on a metal bracket, P, which is secured to the wheel felloe and is held in place by a nut, N, which has a sleeve part, S, before the thread begins and on which part the lug, L, rides when the nut is being tightened. In removing the rim, C, it is but necessary to loosen the several nuts, N, and then turn the lugs, L, through 90 degrees, at which time the rim, C, will slip off over them, and so no small parts have to be entirely taken off.

The Firestone rim, Fig. 5, of the Firestone Tire and Rubber Co., is suitable for use with the company's quick-detachable rim or with a straight clincher, the illustration, Fig. 5, showing it with the quick-detachable type. This rim has a band, B, shrunk on the wheel felloe, the band carrying the usual flange on the inside against which the rim, C, rests. A ring, R, is secured to the inner side of the tire rim, C, and this rests against the flange on B, and also against a doubly cone-faced ring, L, which is wedged between the rim, C, and the band, B, by the action of nuts, N, on the transverse bolts. These nuts exert their pressure on the ring, L, through plates, P, which rest on a curved seating, S, so that while the nuts are being tightened there is no binding, the shoulder, S, acting as a hinge.

Split-Rim Demountables

Passing now to the split-rim type of demountables attention is first called to the Doolittle, for which the Goodyear Co. has the selling rights and is shown in perspective in Fig. 3. The Dunlop type of rim, C, is split, S representing the split with the ends separated as ready for slip-

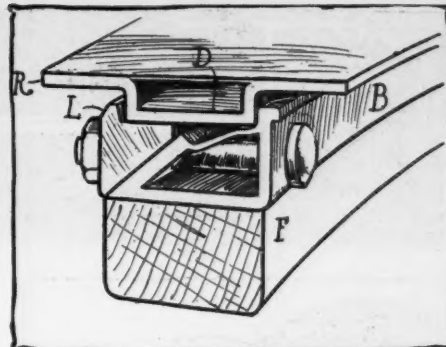


FIG. 7—FISK DEMOUNTABLE RIM

ping onto the wheel. The separation of these ends as well as bringing them together is accomplished by a double turnbuckle action, there being two, one at each side of the rim and only one at T, being indicated in dotted lines. A tool, F, is used for working these turnbuckles, the tool being shown in position with a part going to each of the two turnbuckles, so that they are operated in unison, whether opening or closing the split. The felloe is not shown in this illustration.

A second split-rim demountable is the Universal, manufactured by the Universal Rim Co., Chicago. Fig. 9 shows the widened split in the rim, C, and the tool, T, is used to bring the ends together when clamping the rim on the felloe. On the under side of the rim, C, are secured lugs, L and L1. To the former a linkage, H, connects and into the other the tool, T, in-

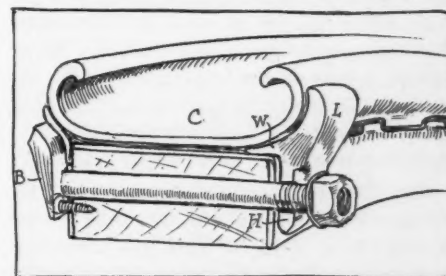


FIG. 8—MICHELIN DEMOUNTABLE RIM

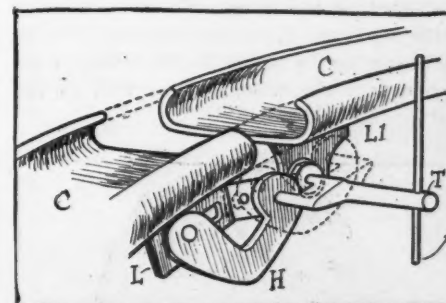


FIG. 9—UNIVERSAL DEMOUNTABLE RIM ..

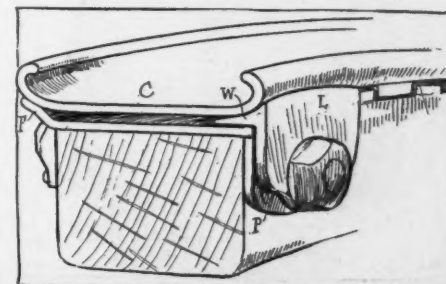


FIG. 10—CONTINENTAL DEMOUNTABLE RIM

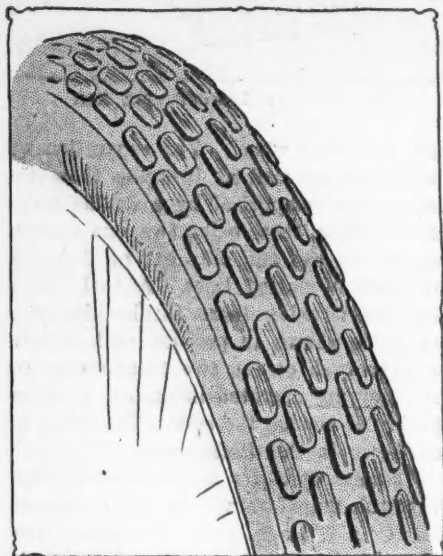


FIG. 11—REPUBLIC STAGGARD TREAD

serts, so that by turning the tool handle in the direction of the arrow, the end of the link, H, is carried around into the dotted position, thus bringing the lug, L, with that end of the rim up into the closed position, in which place the link, H, locks against a boss on the lug L1. The link, H, is hinged in a slot in the lug L. One half turn of the tool, T, is all that is necessary in fastening or unfastening this rim.

The Howard rim, manufactured by the Howard Demountable Rim Co., is as shown in Fig. 6, a split-rim tire, the opposing ends of the split rim being brought together by a turnbuckle action, the motion being imparted to the wheel, W, which meshes with a pinion, P, on the turnbuckle stem. A recess has to be cut in the felloe to accommodate the wheel, W, as well as the turnbuckle parts.

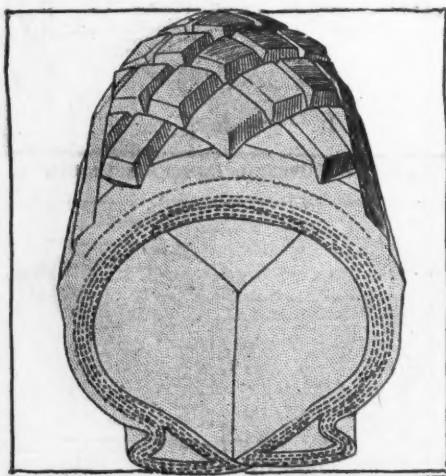


FIG. 13—AJAX NON-SKID

American Stepney Spare Wheel Co.—

Stepney wheels are now made to fit every kind of quick-detachable as well as clincher rim. In addition to this feature, the company offers for 1910 a Stepney combination wheel that can be used on a car that has front and rear wheels of different diameters. By the use of this combination wheel, the motorist who has such a car only has to carry one Stepney wheel instead of several casings and tubes. The combination Stepney is attached the same as the regular Stepney, but adjusts itself properly to the different sizes. As is well known, the Stepney spare wheel is a device that is carried instead of an extra casing, being a rim fitted with an extra tire already inflated and attached and which can be fastened to the wheel of the car by means of a series of clamps, the whole operation requiring but a few moments of time. When in position the Stepney rim is at the outside of the permanent wheel rim.

B. F. Goodrich Co.—Conspicuous in the exhibit of this concern are the Palmer web tires in numerous sizes, as well as the Goodrich wireless solid tire for motor trucks. This concern has been cautiously developing the Palmer tire for some time and at present is using it extensively for electrics, the claim being made that a greater mileage can be obtained from the battery when these tires are used. The tires are made with smooth and Bailey treads. The Goodrich company is making

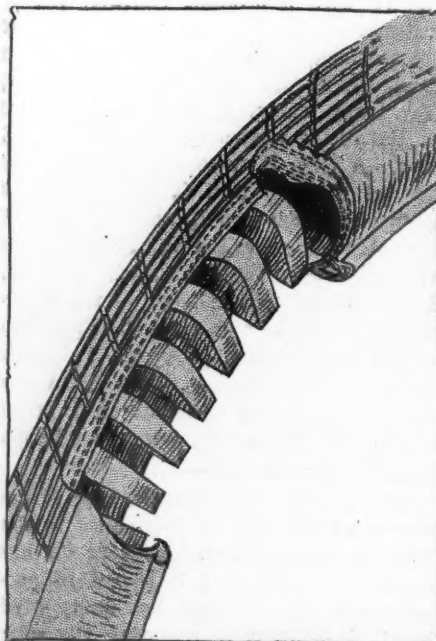


FIG. 14—DAYTON AIRLESS TIRE

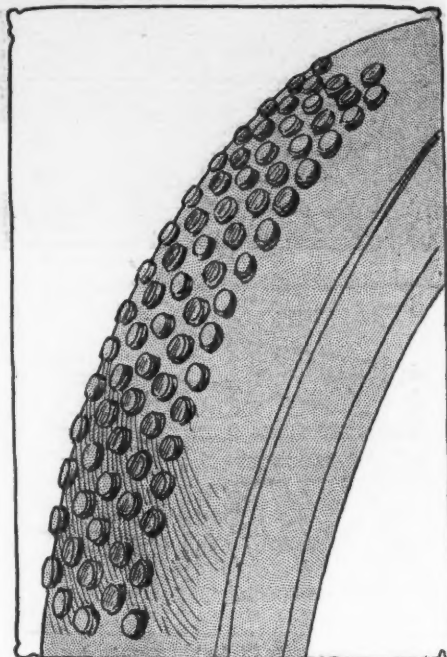


FIG. 12—CALMAN NON-SKID TREAD

a specialty of producing interchangeable tires to meet the demands of motorists whose cars are under shod. For example, a car with 36 by 4-inch tires can be changed to 35 by 4½ by the use of the old rims on the car. Or a 34 by 4½ rim will accommodate a 35 by 5 quick detachable tire. Forty and 42-inch tire sizes are shown. The Goodrich truck tire, brought out a year ago, has a special steel base with a sub base of hard rubber, the latter in union with the former, and the rubber tread or tire proper is vulcanized to the hard rubber sub base. This tire requires a special steel felloe and with lugs placed on either side of the steel base and keyed on the felloe band, which fits into a key, set on the base of the tire, circumferential movement is thus prevented.

Continental Caoutchouc Co.—In addition to its demountable rims this tire line is represented by a steel studded anti-skid of Continental design, this antiskid being made in clincher type to suit the Continental demountable clincher rim, and also in the quick detachable type for American detachable rims.

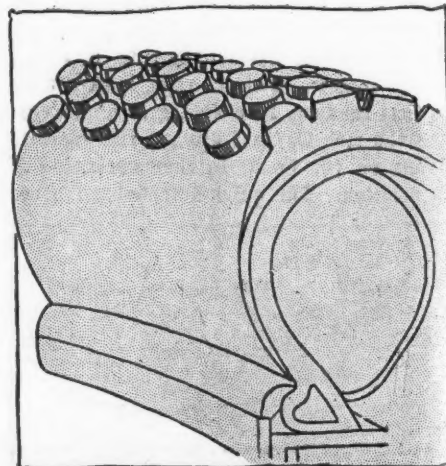


FIG. 15—DIAMOND ANTI-SKID



FIG. 16—FIRESTONE ANTI-SKID

Morgan & Wright—Morgan & Wright's new non-skid tire is called the Nobby, Fig. 18. This tire has just completed about 6 months of tests and trials under adverse conditions and is now ready for the market. The name Nobby, presumably, is derived from the knobs which are cast into the tread. The illustration shows the nature of the design. In construction Morgan & Wright have gone back to the old principle employed in the construction of traction engine tires. The rubber projections on the tread are obliquely placed and of oval form, to resist wear.

Ajax-Greib Rubber Co.—At the Ajax stand a new diamond tread tire, Fig. 13 is shown for the first time. This all-rubber non-skid tire is guaranteed for 5,000 miles and is claimed to be somewhat different from the ordinary run in that the raised diamonds are so designed as to prevent flattening and squeezing into a smooth surface when under weight. The company also shows the same designs in motor cycle tires as well as the smooth tread which it has marketed with success for so long. An illustration gives an idea of the appearance of the diamond tread.

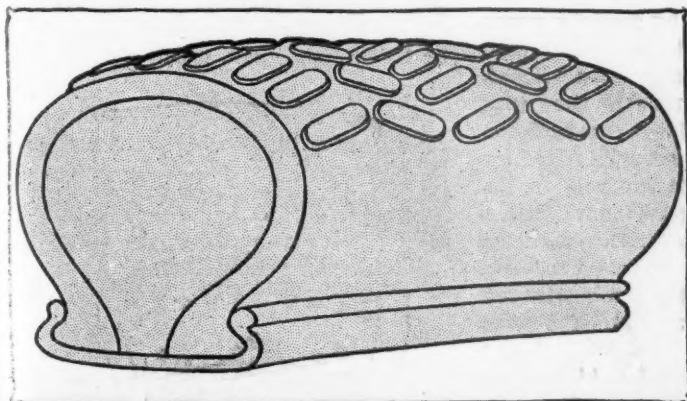
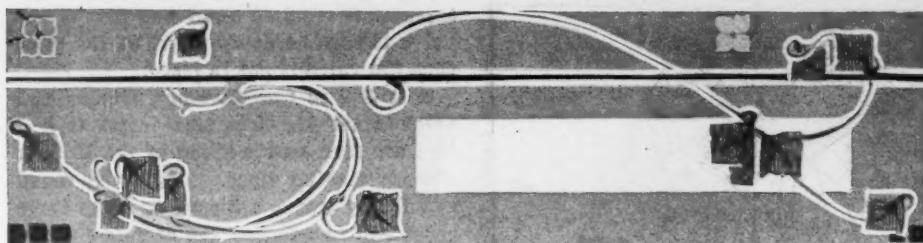


FIG. 18—MORGAN & WRIGHT'S NEW NOBBY TREAD



Diamond Rubber Co.—At the stand of the Diamond Rubber Co. will be noticed a new motor cycle tire and a new demountable rim. The design of the Diamond motor cycle tire is of the rib type, the ribs running circumferentially around the tread. Three of these ribs are sufficient to prevent side slip and still retain their resiliency. The inner tube is protected by a flap glued to one side of the casing which, when properly put on, keeps the tube from the metal rim, in a like manner to the motor car type of tire. The Diamond Anti-Skid is shown in Fig. 15. This company also manufactures rubber steering wheels, battery boxes, etc., of which a large variety is exhibited in addition to other wares in the hard and soft rubber line.

Goodyear Tire and Rubber Co.—The Goodyear Tire and Rubber Co. has augmented its Bailey non-skid tire with a block or diamond-shaped heavy tourist type, which is shown in all sizes for large cars. This tire will be pushed for heavy car and taxicab work and where extra hard usage occurs. In connection with the Goodyear Universal Q. D. rim this block design tire becomes a very satisfactory equipment.

Empire Tire Co.—The Empire checkered tread tire, Fig. 19, is this firm's new product for 1910, and will be pushed as a leader. It has all the qualities of the all-rubber non-skid tires. An illustration gives an idea of the design of the tread in which rectangular-shaped rubber projections are used on the tread.

Cryer & Co.—The Kempshall tire, Fig. 17, is an importation from England and has been on the market there for several years. Lately the non-skidding properties contained in the tire have been improved and strengthened. The principle of this non-

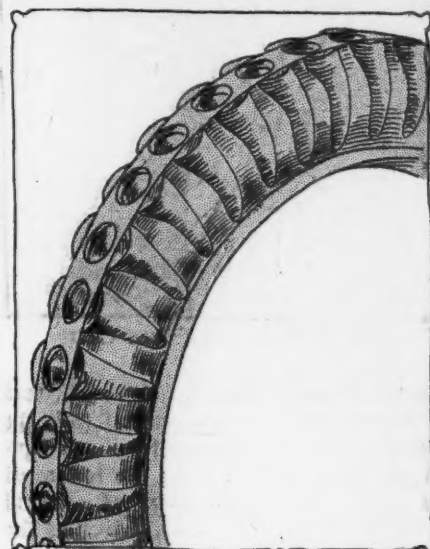


FIG. 17—KEMPSTALL ANTI-SKID

skid tire is in the formation of the tread and sides adjacent to it. As seen in the illustration, ducts or vacuum vents are formed within the tread proper and, aided by the ribs or turrets on the side walls of the tire, serve jointly as a means of preventing skids. The ribs on the old pattern as first brought out and described showed the ribs to extend only partially down the tire wall. It is claimed that while they were satisfactory, the extension of the ribs all the way down the wall has increased the efficiency and strength of the tire considerably. The principle of the duct is perhaps well known as a suction device. The supporting ribs not only aid in preventing side slip under any condition, but are claimed to prolong the life of the tire.

Firestone Tire and Rubber Co.—One of the first examples of the all-rubber non-skid heavy-car type tire to be produced

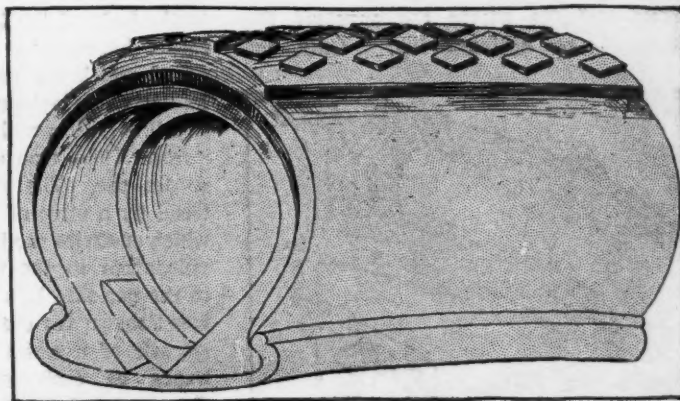


FIG. 19—EMPIRE'S NEW ANTI-SKID TIRE

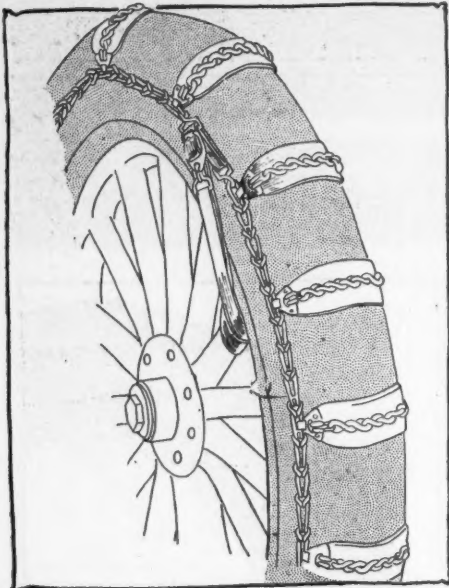


FIG. 20—WOODWORTH TIRE CHAIN

was the Firestone, Fig. 16. This firm, instead of forming its cases with projections in the shape of buttons, stars and the like, adopted the novel idea of using the letters of its name. The same pattern of non-skid is continued for 1910. This, as well as the regular line of pneumatics, is furnished in both the pliable clincher and the stiff head type. Other kinds of tires, both pneumatic and solid, also are shown.

Michelin Tire Co.—The Michelin exhibit is designed to be of an educational nature and one of the interesting features of it is the Michelin anti-skid tire. The anti-skid feature is an integral part of the tire and not an attachment, the tread being made of leather instead of rubber. In this leather tread are imbedded from three to five rows of steel rivets which are turned out of the softest kind of steel and then chilled by a special process to harden the surface so it can resist wear, and at the same time the strength of the rivets is not impaired because of their soft interior. The leather tread is made of ox hide. The Michelin quick-detachable is also displayed, as will a flat compressed tread tire. A new idea is the Michelin valve spreader which holds the beads of the envelope firmly in the clinches of the rim, thus doing away with security bolts. As its name implies, it is a part of the valve itself and fits within the envelope the same as an ordinary lug. Only one

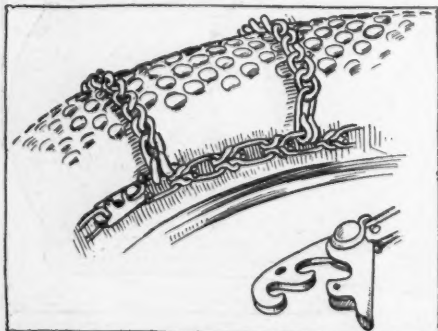


FIG. 22—THE WEED TIRE CHAIN

spreader is required and being part of the valve it may be easily fitted at the same time the valve is put in place.

G & J Tire Co.—Clincher, Dunlop and quick-detachable tires made after G & J idea are seen on the stand of the Hoosier concern making them. Both the round and Bailey treads are used on these three types and in addition the company shows its line of motor sundries consisting of tire sleeves, rubber axle bumpers, tire tools, gas bags and other accessories.

Rutherford Rubber Co.—Sterling tires and inner tubes are shown by the Rutherford Co., the claim being made that the pre-cure of the bead and the thickening of the rubber just above the bead prevent rim-cutting. A feature of this tire is the use of a friction compound which is placed between the layers of fabric holding it so tightly together that it is claimed the fabric will tear before it will separate. The company also manufactures solid tires for carriage use which are made of a tough, interwoven, knotty mass of rubber. The Sterling inner tube is distinguished by its blue color and is built up in four cross-grained layers. The ends are vulcanized together and not cemented. The final operation is a layer of rubber of a bright blue color which, it is said, helps to keep the tube cool and prevents the inner rubber from checking and oxidizing while it is not in use.

Republic Rubber Co.—The staggered tread, Fig. 11, which was one of the pioneers of this line, is shown again. These studs of rubber formed integral with the tread are of oval shape with a long diameter arranged circumferential with the tread. Using the rubber instead of steel projections permits of using this tire all the year round. In addition to this various other types of tires, including round and flat treads, are shown. The exhibit includes manufacturing samples, showing how rubber is forced through the canvass in such a manner that it is claimed that it makes blistering impossible with these tires.

Pennsylvania Rubber Co.—This Pennsylvania house shows its rubber-wrapped tread and flat tread clincher tires, which have been improved and are now made with a tufted white tread securely held to the body of the tire by specially woven fabric impregnated with a peculiar compound which the company has developed. The exhibit includes non-skid tires with a leather tread provided with case-hardened rivets. These tires are specially suited for winter use. The rivets are held in the tread by a strip of chrome-tanned leather which encircles the tread, the leather being vulcanized to the tire body. A novelty in the non-skid line is the new suction-cup tread shown for the first time. The tread consists of a series of rubber cup shaped knobs of such size as to withstand the wear and abrasion and yet form suction in the cups to prevent slipping. A

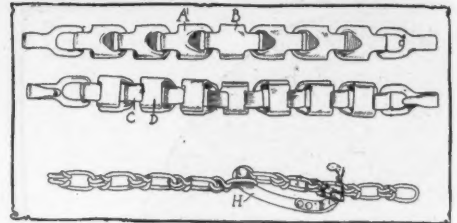


FIG. 21—FOX ANTI-SKID CHAIN

big novelty is a pair of areoplane tires 20 by 4 inches.

Hartford Rubber Works—This exhibit includes a regular line of Dunlop, clincher and quick-detachable tires, to which must be added the Hartford wire-grip anti-skid line. A clincher tire for motor cycles is shown. As in some of the other exhibit spaces, manufacturing samples of para rubber are exhibited, including the rubber biscuit, washed rubber and samples of various fabrics which enter into the make-up of a tire.

Swinehart Rubber Co.—This exhibit includes the company's regular line of solid cushion tires for motor cars, trucks and delivery wagons, as follows: Clincher truck tires and demountable rims, cellular tires for taxicabs, touring cars and light delivery wagons; Clincher tires for motor buggies, and in addition to these there is shown for the first time a line of clincher and quick detachable pneumatic tires which the company is marketing for the first time. Also shown is the Swinehart quick detachable bolted-on flange rim, in which with the flange removed the old tire may be slipped off and a new one put on without any other special tool than an ordinary wrench. This eliminates the trouble of shipping truck wheels to a tire depot to have new tires put on. The Swinehart twin-tread bridge tire, made under Caldwell patents, of which the Swinehart Clincher Tire & Rubber Co. is the exclusive licensee, is exhibited. This tire is intended for electric pleasure cars and is claimed to draw from five to six amperes less electric current than any other solid tire. It fits onto standard clincher rims.

Zeglen Bullet-Proof Cloth Co.—No changes in the Zeglen tire have been made since the last show. The claimed punctureproof qualities are secured by the use of an inner tube which is protected by bullet-proof cloth, which cloth is fric-

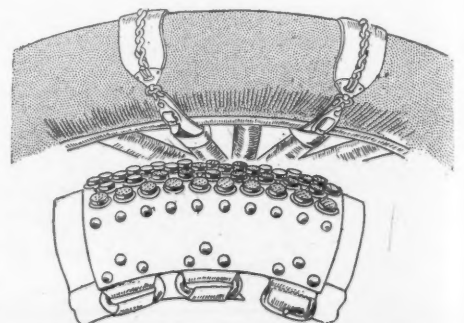


FIG. 23—WOODWORTH BOOT AND CHAIN

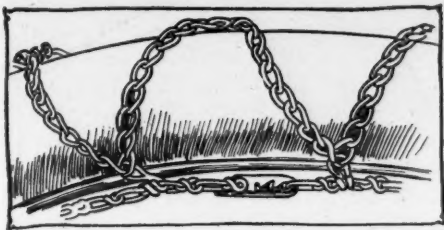


FIG. 24—ZIGZAG TIRE CHAIN

tioned until the pores are filled with rubber, then cemented and vulcanized, forming a compact, firm, yet resilient casing.

Leather Tire Goods Co.—This concern shows its full line of Woodworth tread devices, consisting of the improved self-adjusting tread, the Woodworth tire chain complete, the single tire chain, and the light repair boot. The tire chain complete, Fig. 20, has the usual crosspieces, provided with heavy leather pads under the chain to keep it from contacting with the tire. The cross chains are 5 inches apart and the side chains to which they attach lie flat against the side of the tire. The side chains have a ring on each end which connect by a 1-inch chrome leather strap with one spoke of the wheel. The self-adjusting tread, Fig. 26, is designated self-adjusting because of the springs S which accomplish this work, the tread of this device having a chrome leather base with a specially-treated leather outer cover in the tread of which are several rows of thick-headed rivets and in the sides flat-headed rivets. The Woodworth single tire chain straps to the wheel spokes as illustrated in Fig. 23. Each cross chain rests on a strip of chrome leather. The light repair boot, Fig. 23, is made of two heavy plies of chrome leather, which are re-enforced by a third in the middle or tread part. The tread is provided with thick-headed rivets to take the wear. The boot is held to the tire by a 1-inch leather strap which laces across the rim through two links on each side, and is adjusted at the end by a buckle.

United Manufacturers—In working on the 1910 product it was not found necessary by the Weed chain people to make any radical changes in its tire chains. Probably the only alteration made has been to use a special process steel which is not brittle and yet is hard enough to stand the wear to which it is put. One of the great-

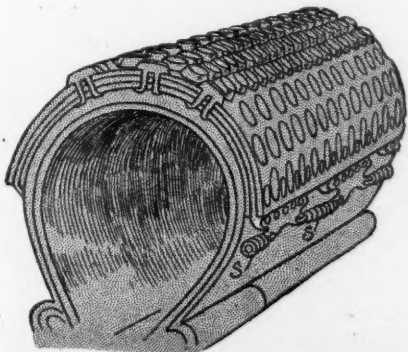


FIG. 26—WOODWORTH ADJUSTABLE TREAD

est difficulties confronting the makers has been to provide the chains of many sizes which has been made necessary by the fact that the car makers are going in for larger sized wheels, in many cases, for 1910. To meet his demand, the Weed chain makers have added to their line until now they carry seventy-six different sizes of chains in stock, which will fit every kind of wheel known, including pleasure motor cars, high-wheel motor buggies and motor trucks. The cross chains used are brass-plated. The chain is shown in Fig. 22.

Philip C. Traver Mfg. Co.—The Traver non-skid device, Fig. 25, which is of the chain idea in appearance, but which depends on inverted steel plates, P, suitably placed at intervals around the tire, held by chains as shown in Fig. 25, will be demonstrated. This firm sells these anti-skid chains with a guarantee of 1,000 miles without breakage. To prevent cutting or wearing of the tire, a spring attachment, S, at the side is used. This spring serves also as a means of preventing rattling, looseness and other troubles common with chain non-skids. The company also markets a single clip device, Fig. 27, in which as many individual clips as desired can be used, each fastening around the felloe at the spokes.

Fox Metallic Tire Belt Co.—The anti-skid chain of this concern is illustrated in Fig. 21 and is known as the Fox anti-skid. The cross chains on this anti-skid have flat links, which are bent and interlocked, giving the effect of a broad band, flat on the side, which rests against the tire, but possessing small square projections on the tread which contacts with the road. The wearing surfaces are flat pieces 1 inch square, the square design being introduced on a claim of superior power. These cross links attach to the usual side chains, which are brought together by a patent clamp which is pivoted at one end to the chain and the other end is inserted in the large link and serves as a lever to draw the chain into place, which when done the clamp hooks as illustrated, giving a positive lock.

Dayton Rubber Mfg. Co.—The Dayton Airless tire, Fig. 14, is again shown without change except in the nature of the different treads. This firm will produce for 1910 what they call a double grip non-skid tire, which shows a flat corrugated tread with diagonal depressions about 1 inch apart. It is claimed that tests of this tire have shown exceedingly good results, and the Dayton people intend to go after the taxicab and motor delivery business.

Calman Asbestos and Rubber Co.—Another importation in the way of tires makes its appearance in the Calman tire, Fig. 12, which is manufactured in Hamburg, Germany. The importer is the Calman Asbestos and Rubber Co. of America, and besides tires it makes a prepared brake lining of the asbestos type, which is especially made to withstand rough use, such

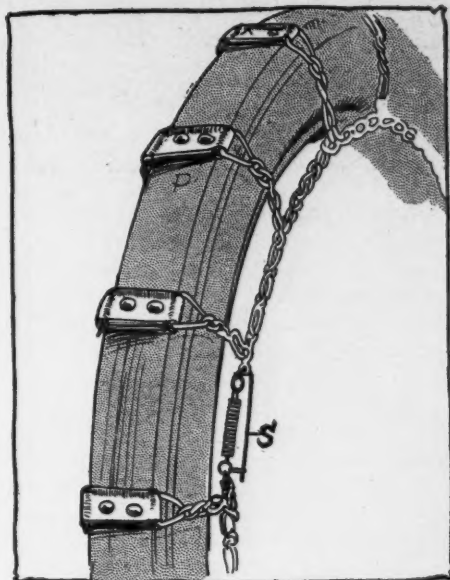


FIG. 25—TRAVERS TIRE CHAIN

as resisting water, oil, undue heat and similar destructive elements usually found where such articles are used.

Brown Co.—The Brown Co. has a variety of gauges, among which is the Brown pressure indicator. This gauge is made to register the exact pressure at which a tire is inflated, and is a handy instrument for particular owners and others who desire to know tire pressures. The company also has the garage spark plug wrench set. This wrench set consists of three sizes of collapsible handles with nickel-plated plug wrenches. They are neatly packed and form a very useful article for garages and private owners of several cars.

National Appliance Co.—The Zigzag tire chain, Fig. 24, differs from many of the more conventional anti-skid chains in that the cross links do not cross the tire treads at right angles but are angled first in one direction and then in the other. This design is intended to increase the anti-slipping features of the device. These circumferential chains which lie against cross chains attach as usual to a pair of the rim and have fastening means to permit of removing the chain.

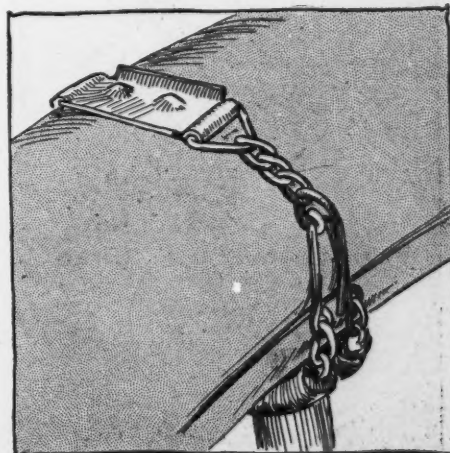


FIG. 27—TRAVER SINGLE CHAIN

Speedometers

Warner Instrument Co.—Warner auto-meters are shown in the complete line with clock combination. In the new models the improvements are in minor interior details, and in obtaining more compact external appearance. An effort has been made with a view of standardizing the equipment so as to fit any car without special brackets or fittings. The Warner speedometer, Figs. 3 and 5, operates on the magnetic principle, a rotating magnet driven by flexible shaft from the front road wheel producing a drawing effect on the indicating dial. The exact amount of draw being in direct proportion to the speed at which the magnet rotates. The Warner instrument is made with a circular dial, in which are three record openings—one showing the speed in miles per hour, the other a trip odometer, the third a complete year odometer. In some of the older type instruments the odometer is not contained within the instrument.

Stewart & Clark Mfg. Co.—The feature of the Stewart line of speedometers for 1910 is the abandonment of the centrifugal force system for the multi-polar or magnetic, Fig. 1 and 7. The company brought out the multi-polar a year ago but did not give up the other system, but during the summer it decided to drop the former and put all its eggs into one basket. With but one exception all the 1910 Stewarts are new.

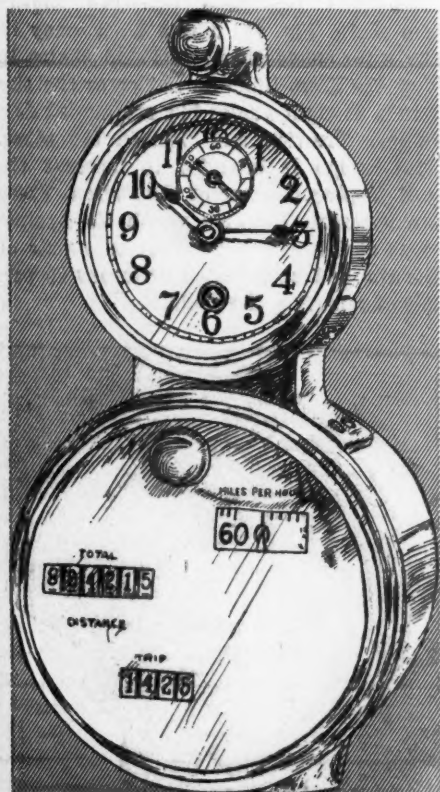


FIG. 3—WARNER COMBINATION SPEEDOMETER

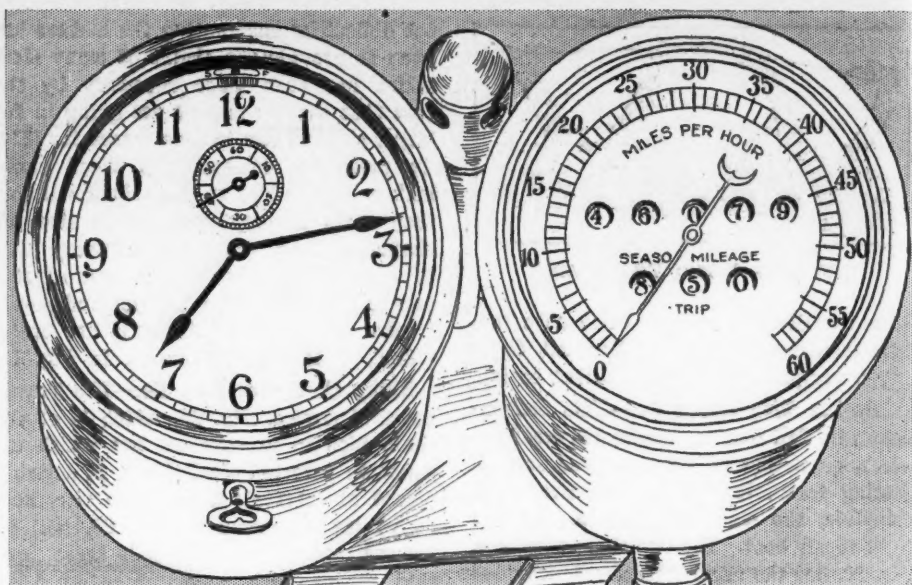


FIG. 1—STEWART MULTI-POLAR SPEEDOMETER WITH CLOCK

One of the features of the odometer incorporated in the speedometer is the spur-gear drive in which all gears are cut from forgings, the ratchet drive formerly used being done away with. The necessity for spring pawls has been done away with by the use of positive spur gearing for actuating the train. The use of springs for a set-back has been discontinued in the trip mechanism, this being accomplished by making the set-back lever engage through small hardened steel pawls with small steel gears having nine teeth, the tenth tooth opposite the O on the dial being cut away, so that when the pawl reaches the place where the tooth is cut away, further movement is impossible and the dial will rest at O until carried forward by the movement of the vehicle to which it is attached. Also new in the Stewart is a ball-bearing swivel joint designed to take power from a large gear at the road wheel through the medium of a steel pinion and deliver to the flexible shaft at a constant angle without regard to the angle to which

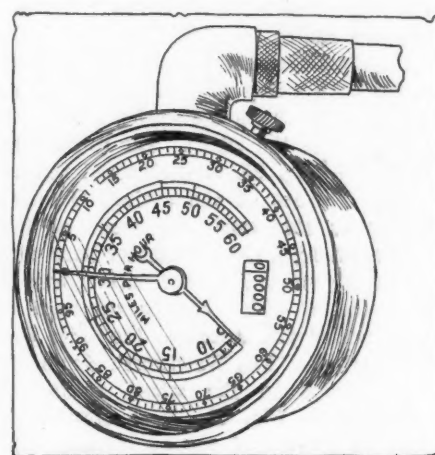


FIG. 2—HOFFECKER CENTRIFUGAL SPEEDOMETER

claimed advantage for this is the elimination of short bends in the flexible shaft. Brackets of a new design also have been brought out, the brackets being designed to fasten to the dash, permitting the flexible shaft to hang in a low sweeping curve along the outside of the frame to the swivel joint at the wheel. There are two styles of these brackets and their use permits of the attachment of the instrument without filing, fitting, or cutting. The line of speedometers ranges from 50 miles up to 90, the size of the dials varying from 2½ inches in the cheaper instruments to 4 inches in the higher-priced ones. Combination speedometers and clocks are shown.

United Manufacturers—Four new instruments have been added to the Jones line of speedometers for 1910, two of which have 3-inch dials, one showing 50 miles and the other 60. Another is a 60-mile instrument at a slightly increased price and which has a 4-inch dial. The fourth new instrument is still higher-priced, registering a speed up to 80 miles an hour and having a 4-inch dial, Fig. 4. Jones retains his principle, centrifugal force, but among the refinements noted is the use of a vertical connection connecting the flexible shaft with the instrument, whereas in

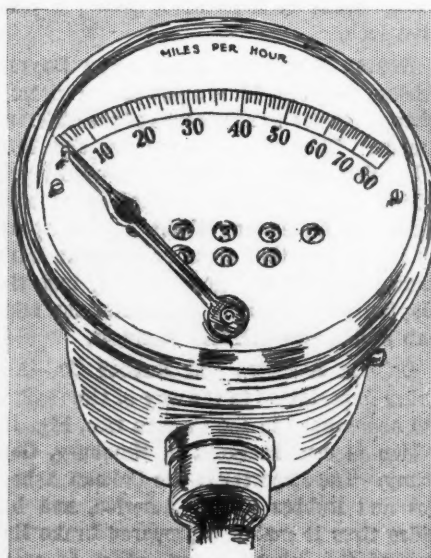


FIG. 4—NEW JONES SPEEDOMETER

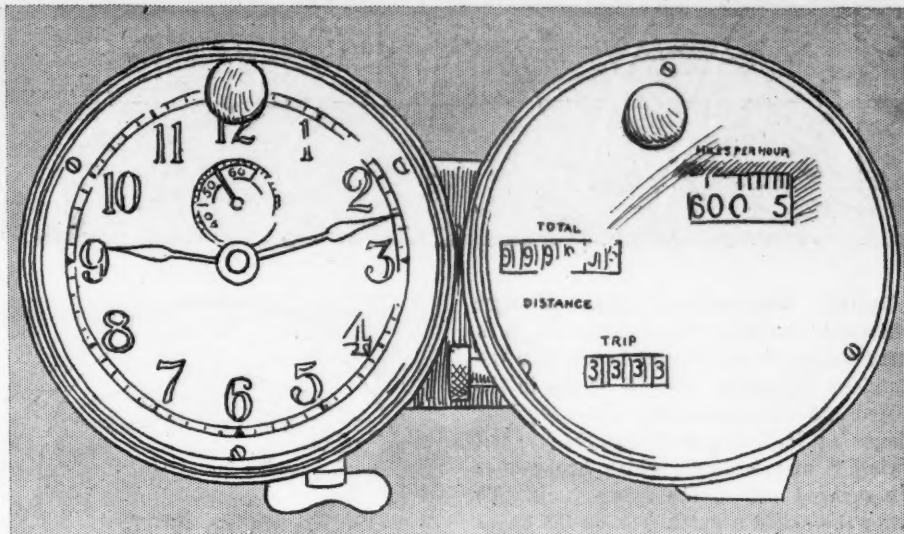


FIG. 5—WARNER'S MAGNETIC SPEEDOMETER WITH CLOCK

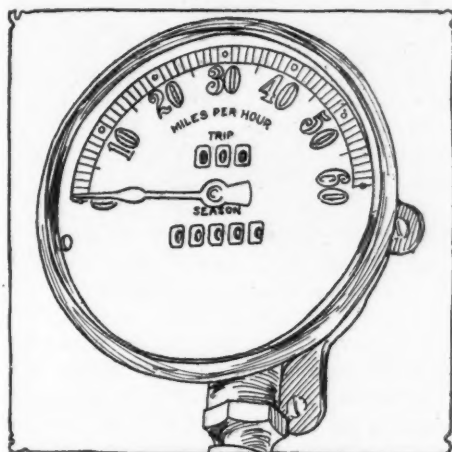


FIG. 6—THE AUTOCRAT SPEEDOMETER

1909 the connection was made by means of an elbow placed on the side. This vertical connection is on the bottom of the instrument. Since Jones has used his own odometer on his cheaper instruments, he has improved it by the addition of a ratchet which knows no left or right; in other words, it does not make any difference whether the car is run forward or backward, the mileage is registered just the same. Another feature in connection with the odometer is that it is placed inside the speedometer for 1910 and that it is finished with an instantaneous reset, permitting of setting the instrument back to 0 with one motion.

Troy Carriage Sun Shade Co.—This concern has entered the speedometer field with a pneumatic instrument, Fig. 13, in which is a small drum beneath the recording part of the instrument. Within this drum is a pressure generator which increases or decreases the pressure according to the speed of the car. This generator does not circulate the air in order to move the indicating needle showing the miles per hour, but acts by pressure, which pressure is transmitted through small copper tubes shown. This instrument is regulated for different sizes of road wheels within itself and for different wheels it uses the

same sprocket gears. Two or more instruments can be operated from the one air tube, permitting one instrument to be located on the dash and the other in the tonneau. There is no flexible shaft for transmitting from the front wheel to the instrument on the dash, the air line being the only connection.

Veeder Mfg. Co.—On the Veeder odometers and tachometers for 1910 is found a new-style, twisted-tooth drive gear which is said to have the advantages of a machined or milled gear with the additional advantage of being light in weight. It is a self-cleaning gear practically, as the thin edge cuts the mud. This is one of the things displayed by the Veeder company which also shows cyclometers and counters. These counters are shown in operation running at a high rate of speed. Then, too, there is a miniature endless belt upon which are attached small brass rows representing barrels or any materials to be lifted up a chute or incline. An attached counter registers the passing of these brass rows. A number of tachometers run at

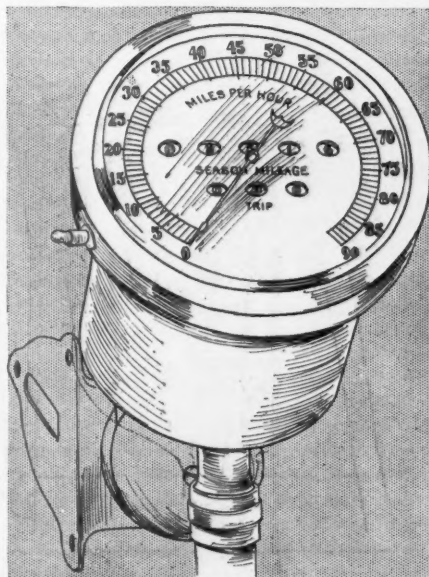
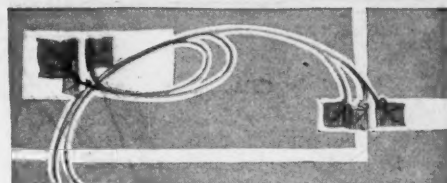


FIG. 7—STEWART MODEL 19 SPEEDOMETER



high rates of speed to show the revolutions of the shaft per minute. Trip and total mileage odometers also are displayed in operation.

Hoffecker Co.—The Hoffecker speedometer is shown in two models—one, G, which is practically as the present excepting that it is designed to register speeds up to 90 miles per hour. The second of the new models is a low-priced instrument registering to 60 miles per hour, and has incorporated with it both trip and season odometers contained within the instrument itself. This instrument, Fig. 2, has the round dial.

Auto Improvement Co.—In its line of Ever-Ready speedometers this concern shows several new types, one the Reliable, Fig. 8, designed to read up to 60 miles an hour and which is shown in combination with a clock. Another new type is the Autocrat, Fig. 6, also shown with clock combination. This instrument differs from the Reliable in that it has both trip and season odometers. Several improvements have been made in the 1910 instrument. In the first place, a steel-lined brass casing is fitted as a protection to the inner shaft. In all speedometers fitted with a maximum hand a new improvement is that this hand does not act as a drag

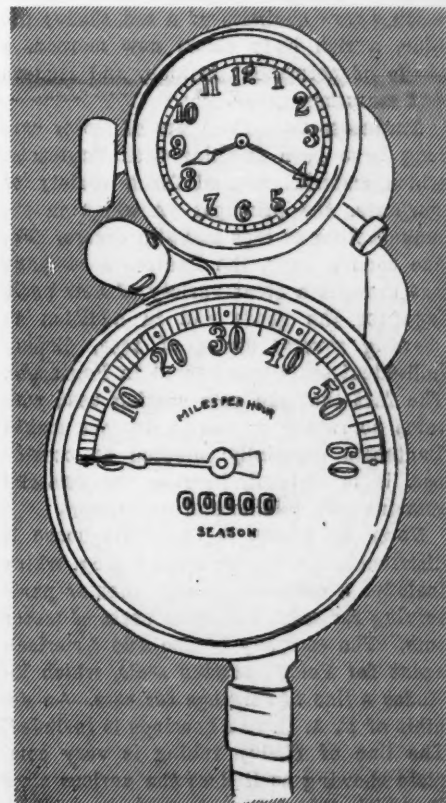


FIG. 8—EVERREADY RELIABLE SPEEDOMETER

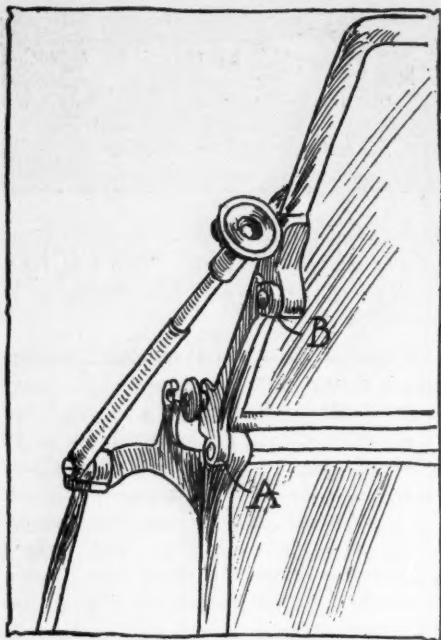


FIG. 9—SPRAGUE WINDSHIELD

on the speed hand, but is entirely separate from it. A new plan for testing speedometers before being shipped is used, in which each instrument is run to 1,000 miles and the speed hand tested at 5, 10, 20, 30, 40, 50 and 60 miles.

Valentine & Co.—The new thing this concern shows is its full line of vanadium motor car varnishes, a line of goods specially intended for motor car use. These varnishes are full in body, yet easy working and free flowing. They are quicker and harder than the ordinary, and particularly brilliant. The exhibit also shows a full line of motor car colors, among the new ones being: Phenomenal carmine, possessing rare qualities of a red shade; fire blue, a rich body color; new maroon, a shade of permanent maroon, and Hudson and marathon grays.

Pantasote Co.—The users of motor cars long have been familiar with Pantasote, which material is used for a variety of purposes, the principal of which is the manufacture of tops and slip covers. For the coming year, the Pantasote company has brought a great variety of new backings for the goods and in addition to showing several styles of tops, display individual seats upholstered in Pantasote. The fact that the gum coating used contains no rubber or oils to dry out makes Pantasote especially adapted to outside use, it is claimed, because the material remains soft, pliable and waterproof.

Peter A. Frasse & Co.—This house is distributor for Shelby steel tubing, which includes a complete line of tubular parts serving for axles and other parts of motor cars. The company is also sole American agent for Poldi Austrian seals, which includes a line of forgings for cars. An exhibit of F. A. G. ball bearings is included. The line of Shelby tubing is very complete showing as it does the various sizes in which this tubing is made as well as the different cross-sections of these tubes.



United Manufacturers—The Metzger windshield exhibited by this concern is in three automatic types, first in which is the standard Automatic, Fig. 15, shown in the folded and upright position. The top half hinges at H, being held upright by coil spring S and latch C, which hooks over the squared end of the frame work. To lower the shield a quick jerk on the upper half releases it from the control of the catch, C, after which it can be folded as illustrated. In two new types of this shield, instead of the spring S, a patented device is used consisting of a cylinder 5 inches long and $\frac{3}{4}$ -inch diameter. This tube contains a spring which works only when the upper half is approximately within 2 inches of either its upright or folded position, and during the remainder of its swing it is prevented from moving rapidly by friction between two smaller tubes encased within the larger one. A third type is the Friction Automatic, which is the same as the Automatic except that there is no spring in connection with the hinge, and the upper half can be set in any position by simply moving it to such, the friction maintaining it thereat.

Troy Carriage Sun Shade Co.—The Sextette automatic windshield is the 1910 offering of this concern along this line. This shield, Fig. 14, is automatic, permitting of the upper half, hinging at A, being turned to the desired angles. This hinge contains two disks, D and D1, the former with a

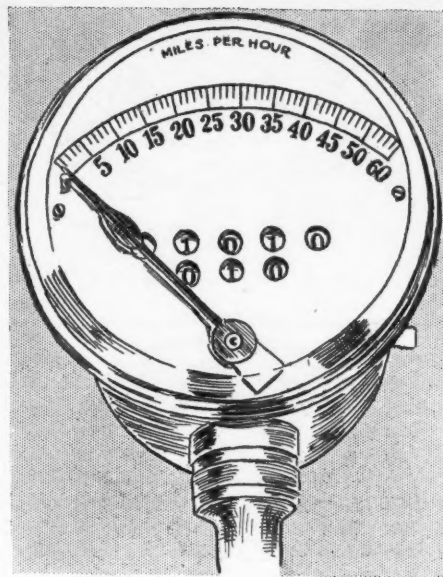


FIG. 10—JONES MODEL 29

single corrugation, the latter with two grooves, into which the corrugation fits. The shield is thus locked by a spring, S, holding the disks together. At B a second hinge is fitted with similar disks, E and E1, which allow of three positions of the upper half for each position of the hinge A. This double-hinge scheme allows of a variety of combinations, meeting the requirements of all cars and varied weather conditions. In connection with the windshield is a pair of lamp brackets attached

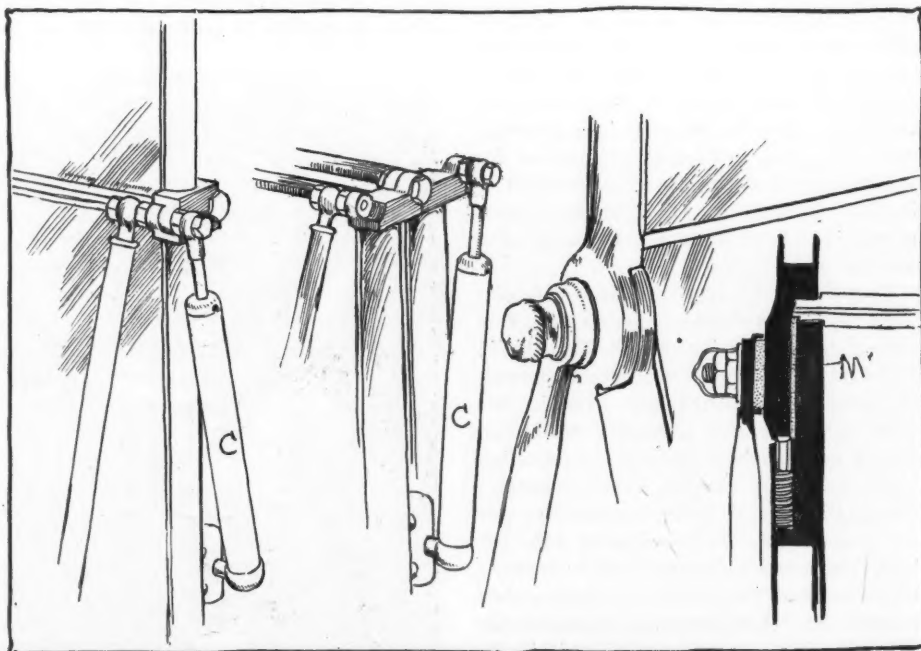


FIG. 11—THE HYDRAULIC WINDSHIELD

FIG. 12—FRICTION AUTOMATIC WINDSHIELD

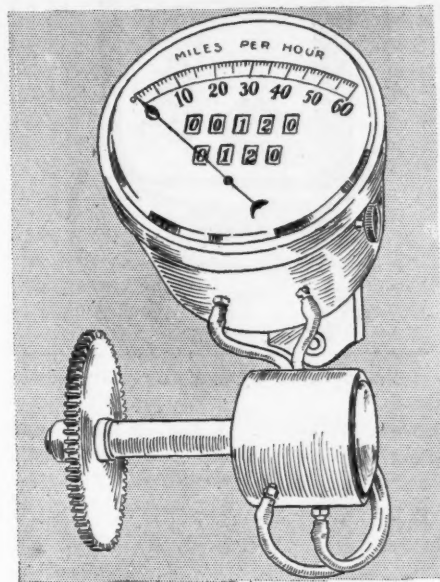
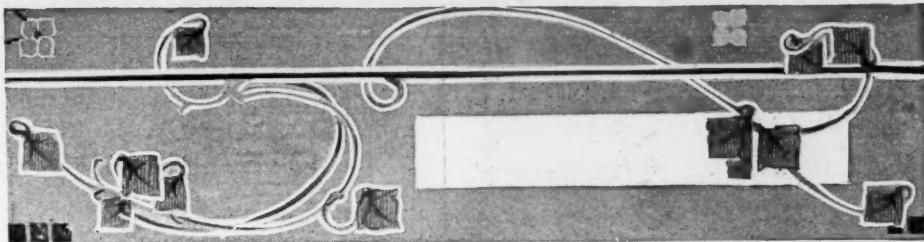


FIG. 13—NEW TROY SPEEDOMETER

at the bottom of the shield instead of on the dash or at the radiator. The lamps are mounted on a ball-and-socket support, which is so grooved that, should the fastening become loose, the lamps do not wobble without support. A handle is provided which enables the driver to loosen the lamp and turn it in any desired direction.

Garage Equipment Co.—This concern is marketing an automatic windshield in which the upper half can be quickly set at any desired angle. The automatic fea-

ture is a friction plate hinge. To change the angle of the upper half it is only necessary to slightly loosen two wing nuts, one at each end, these nuts holding the friction faces of the hinge together and then shift the shield. The lower half of the shield is supported by a telescopic brace rod at each side. At the upper end of these rods are wing nuts which when loosened allow the rods to telescope so that the lower half may be folded horizontally above the bonnet. This gives a variety of adjustments for this shield. In addition to its windshield the Garage Equipment Co. shows its automatic bumper for protecting the headlights of cars. This bumper can be attached without drilling any holes in the frame, in that the attaching brackets are clamped to the frame side members.

Hill Mfg. Co.—This concern is exhibiting a folded wind shield of the self-acting or automatic type, the framework of which is $\frac{3}{8}$ -inch brass tubing, with $\frac{1}{2}$ -inch supporting rod. The shield is made in three widths, 40, 42 and 44 inches. The upper half may be tilted forward or back to any angle at which it is held by compression.

Vehicle Apron and Hood Co.—In the windshield line this house has entirely discontinued its 1909 model and has brought out a new 1910 type, which is of the automatic variety, which folds either forward or back. The folding action is controlled by an oil-tempered spring concealed in the cylinder at the end of the windshield.

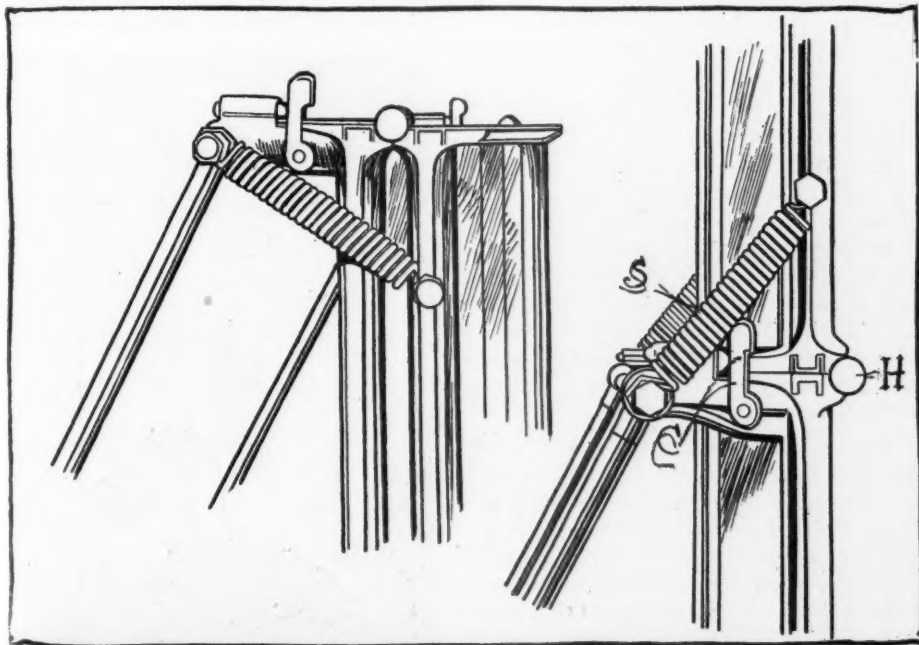


FIG. 15—THE METZGER AUTOMATIC WINDSHIELD

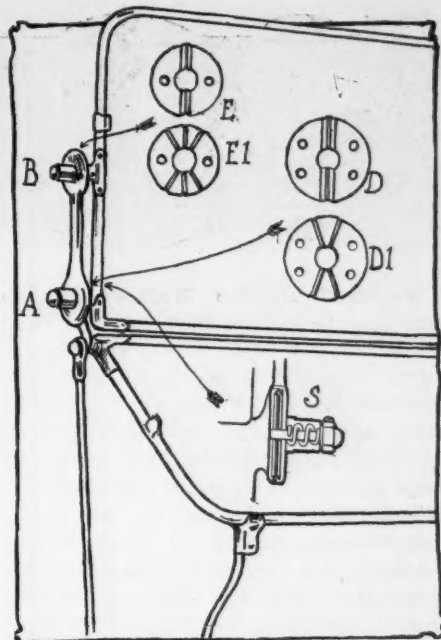


FIG. 14—THE TROY WINDSHIELD

This spring acts in conjunction with the plunger operating the cylinder, the plunger having a double acting leather valve which controls the passage of the air. The frame is of heavy brass tubing and the hinges manganese brass casting. The angling brace rods are adjustable and in order to avoid rattling the glass is mounted in a rubber channel. The shield is made in three sizes—all 28 inches high but varying in length, that for the runabout measuring 37, that for medium touring cars 41 and for large touring cars 44.

Newark Rivet Works—The hydraulic wind shield of this concern, Fig. 12, is entirely automatic, in that when the upper half is being folded, the thumb nut, set screws or other parts have not to be operated with. This is due to a friction hinge, there being friction material, M, between the disk hinges of the upper and lower half, and it is solely due to this that the upper half remains in any position in which it is placed.

Emil Grossmann Co.—This concern shows a hydraulic wind shield, Fig. 11, in which the upper half is held in the vertical or folded position by means of the cylinder, C, which is pivotally mounted at its lower end. Within the cylinder, C, operates a plunger with air-controlling means, so that when the upper half is being lowered or raised this plunger is moved in the cylinder, but once in either the raised or lowered position the piston is in the position of greatest controlment.

W. F. Polson—Polson's wind shields are continued in much the same lines as during 1909. One of these is the automatic, which locks in an upright position, 45 degrees, at 30 degrees and folded. The Polson line includes other types of shields of the folding variety, one of which, model A, the upper half is hinged in an inverted U groove, a finger wheel locking the shield in the vertical position.



Rushmore Dynamo Works—This firm still has the genuine standard flare front Rushmore and plain barrel searchlights. Other lines will be shown, including electric headlights with standard lens mirror lamp, having a spherical Tungsten lamp in which light from the front is thrown back into the lens mirror. For efficiency, this is claimed to be superior to the parabola reflector without its disadvantages, permitting the light to be changed in a few moments to acetylene. Perhaps the company's most important 1910 improvement is its multiplex diverging lens front door, which will hereafter be Rushmore's standard equipment, and manufactured in very large quantities. This lens consists of vertical strips of glass ground plano-convex in a horizontal direction only, taking the place of the common glass strips. The multiplex lens spreads the light out over a wide plane horizontally without wasting the light under the car or in the sky. It projects forward, much of the light coming from the front of the flame and overcoming flickering even at high speeds, and reducing glare, which is objectionable. Some of the best American and European makers will fit these lamps, and when the Rushmore installs its new machinery for grinding multiplex lenses increased quantities will be made.

Edmonds & Jones—The exhibit of Edmonds & Jones shows their usual line of headlight and other lamps. Oil and electric side lights will be displayed with combination acetylene and electric headlights. Attention to detail is one of this firm's talking points and great stress is put on the fact that Edmonds & Jones lamps are free from leaking. They also are of the interchangeable part idea and in design standard in every respect.

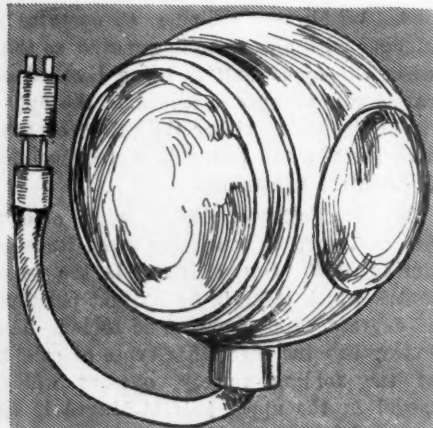


FIG. 1—DIETZ TAIL LAMP

Manhattan Screw and Stamping Co.—The Manhattan Screw and Stamping Co. has a new design of headlight, without any screws showing on the outside. This lamp is called a double-shell lamp, owing to the fact that the whole lamp is made of double metal, each shell supporting the other, with all couplings on the inner body, making a very strong and perfected article. A pamphlet called "Enlightenment" gives full details and illustrations of this lamp.

Atwood & Castle—As is well known in the lamp trade, 1911 products are generally shown at 1910 shows. Lamp firms are obliged to deliver their goods to be shown by makers on their cars, therefore they must be practically one season in advance. Atwood & Castle have a big line for 1911. Their newest lamp is a gas

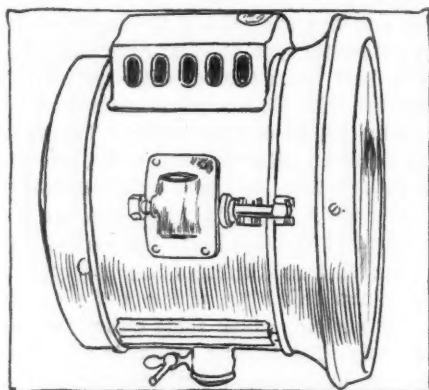


FIG. 2—DIETZ HEADLIGHT

headlight made in all sizes. This lamp is fitted with a new designed top and the body is of one-piece seamless drawn brass. Oil, electric and combination lamps will be shown in great numbers.

R. E. Deitz Co.—The R. E. Deitz Co. has the usual Deitz line. Its headlight is in five sizes. It also has taxi lamps and round side lamps. The line has been much reduced by way of eliminating many useless patterns and giving full attention to the Deitz standard line. The interchangeable adapters for use in oil lamps, Presto, and for changing from oil to acetylene, Comet, will attract attention.

Charles M. Hall Lamp Co.—The Charles M. Hall Lamp Co. has a full line of gas, oil and electric lamps. Its one-piece 20-gauge headlights are attractive both in design and detail of workmanship. The side lights have oil font catches, which prevent leaking and the losing of the font. A match scratcher is fitted by way of novelty. The Hall interchangeable mirrors

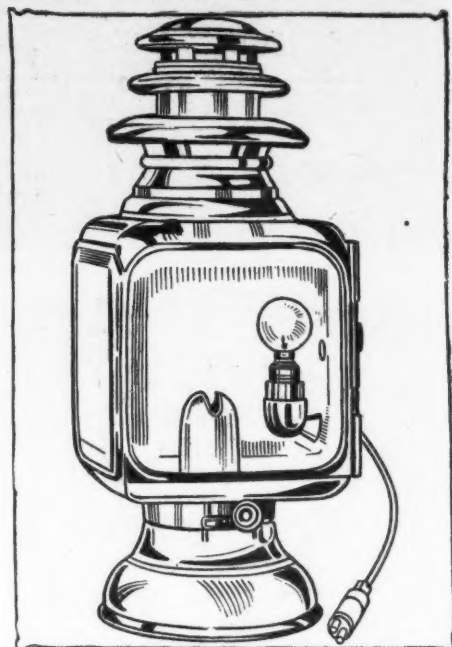


FIG. 3—GRAY & DAVIS COMBINATION

also are attractive. A broken mirror can be replaced without having to return the lamp to the makers.

Frank H. Cross—Frank H. Cross has a close-coupled, short-focus headlight for acetylene which is original. The lamp is of the one-piece pattern and fitted with a short-focus mirror. However, every part is portable and a broken part may be replaced easily. Also the base is so designed as to form a chamber for a subsidiary gas supply, thus doing away with the rubber bulb along the line. Other lines of which this firm makes a specialty will be shown.

Gray & Davis—Gray & Davis exhibits a new close-coupled gas lamp, which has a very shallow body, as a leader. It is made of one piece this year, which simplifies the annealing of the entire lamp. The sizes remain about the same. Gray & Davis also exhibit a line of electric lamps. One of the improvements over the old-style

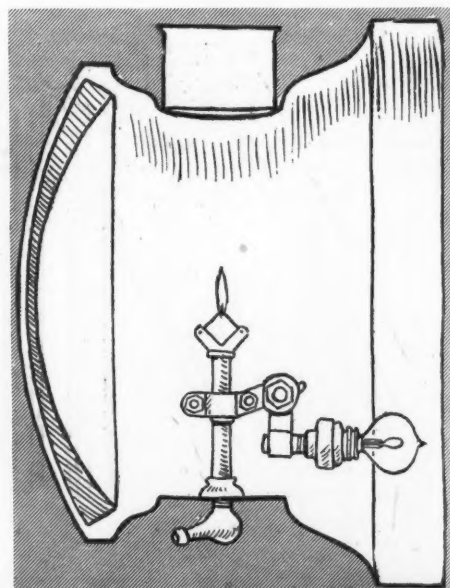


FIG. 4—GRAY & DAVIS COMBINATION

Miscellaneous

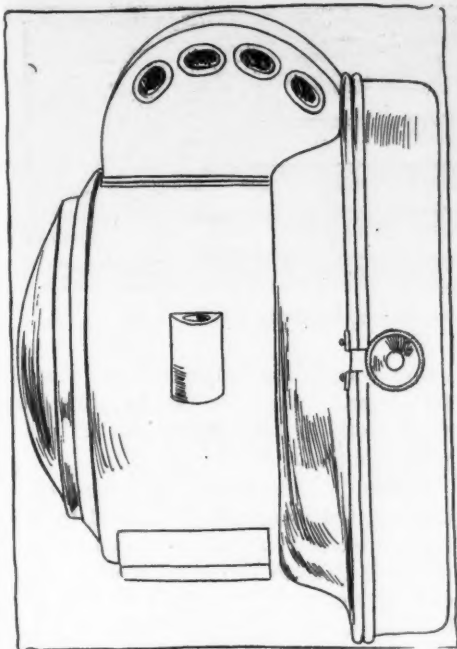


FIG. 5—GRAY & DAVIS HEADLIGHT

type is that there are no rivets or screws showing on the outside. All screws are worked from the inside and are accessible. The usual line of oil and electric and other lamps are displayed.

Coes Wrench Co.—The Coes wrench is exhibited in its 1910 form. These wrenches of the adjustable-jaw type are made of high-grade steel hardened by a special process of the company.

Morrison-Ricker Mfg. Co.—A novelty in this glove concern's line is the Grinnell Rist-Fit. Those designed for cold weather use have large roomy cuffs, and are one-fingered mittens and gauntlet mittens lined with camelshair. Then there are gloves with full knit fingers, wool fleece, lamb-skin and squirrel. For summer use the concern offers a variety of styles, most of which have long stiff gauntlets, while others are of the short-wrist styles. A novelty is several loose styles of turtle-

neck gauntlets with a strap fastener or an elastic wrist. The Grinnell gloves are made from reindeer and coltskin leather and can be washed in gasoline and soap and water and dry out soft and pliable.

Fried-Ostermann Co.—Price motoring gloves are displayed by the Fried-Ostermann Co., which is the successor to the Henry W. Price Co. One of the features of the line is a pearl washable one-finger horsehide mitten, which is lined with imported lambskin and which has an extra stiff black leather cuff on which are a gore and two clasps and which has a strap at

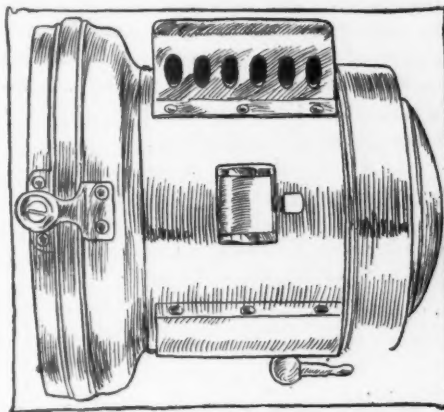


FIG. 7—E. & J. HEADLIGHT

the wrist. Another style is a reindeer or black washable glove with an extra large box cuff, which is $7\frac{1}{2}$ inches deep, the entire glove being 10 inches in length. This is leather-bound throughout and has a button strap at the wrist. It comes unlined or wool-fleeced lined, wool-knit lined, or imported lamb or rabbit-lined. Still another model is a black or tan imported Kasan glove which is 10 inches in length and which has a bell-shaped cape cuff 6 inches deep.

Oliver Mfg. Co.—This pioneer jack concern shows its improved Peerless jacks for motor car use. A feature in conjunction with these jacks is that the handle, besides serving for the jack, may be used as a tire tool or a hammer. The principle of these jacks is that when the handle is working below the level the jack elevates, and when working above the level it lowers.

Elite Mfg. Co.—A feature of this exhibit is the new Ohio ratchet jack which has just been placed on the market. The claim is made for this jack that it contains only one-half the number of pieces found in the ordinary ratchet jack. The lifting bar can be dropped instantly after the

load is released. The handle is so constructed as to serve as a tire tool or hammer. The company's other line of jacks, including the Reliable and Ideal, have been improved by adding larger gears and a larger swivel top.

Q. M. S. Co.—The Auto Cle wrench and metal steps for motor cars make up the exhibit of the Q. M. S. Co., as the Quincy-Manchester-Sargent Co. prefers to be known. Both articles are known to car manufacturers. The Auto Cle is a socket wrench, the feature of which is its adaptability, it being possible to reach almost any part of the car with it. Accompanying the wrench is a set of sockets of varying sizes and lengths.

Noonan Tool & Machine Works—This exhibit space is given over to various tools and specialties, all of which are being shown by a corps of demonstrators. Noonan chisels and punches are shown in leather rolls as well as in wooden boxes. These are given a severe test by being driven through a heavy piece of iron in the exhibit space. The motor car trunk rack in two styles, double and single, is included, as are the valve spring lifters, bent-end screwdrivers, cotter-pin tools, tire irons, wheel remover, muffler cut-out and chain clamps.

Allen Auto Specialty Co.—Its regular line of tire covers, tire holders, tire locks and lap covers is continued for next year. Two new articles are exhibited—one being a tire-holder for demountable rims, with tire mounted thereon, and the other a pressure gauge.

Dover Stamping and Mfg. Co.—The Dover automatic funnels are among the latest offerings of this concern. The automatic funnel carries a ball check at the top of the spout and which ball when

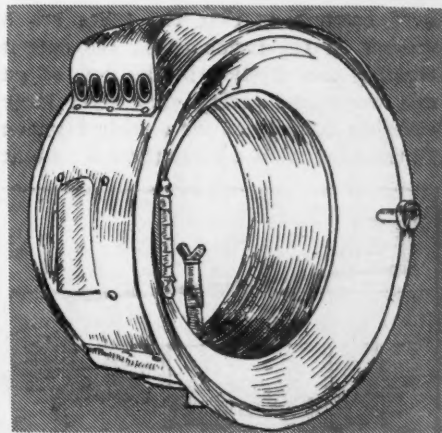


FIG. 8—ONE OF THE SOLARIS

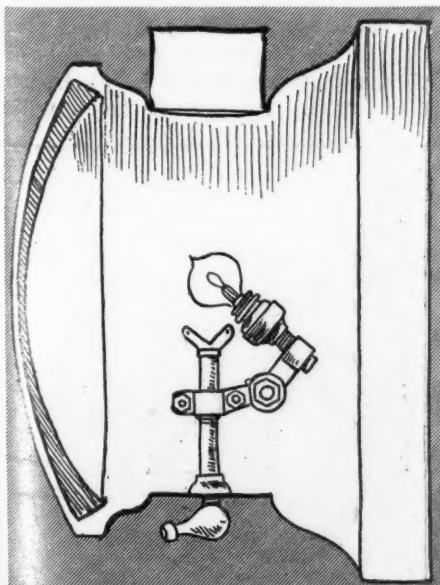


FIG. 6—GRAY & DAVIS COMBINATION

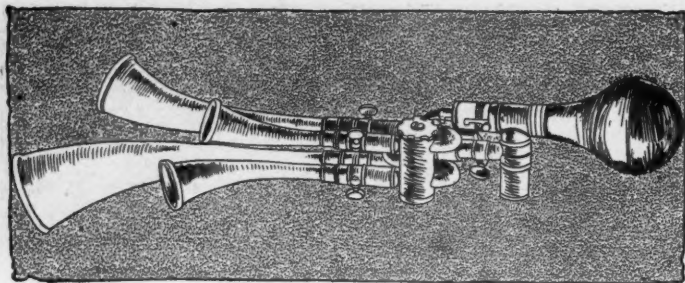


FIG. 9—TESTOPHONE HORN

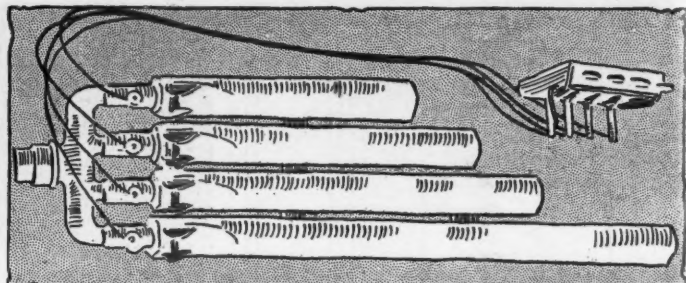


FIG. 10—GABRIEL TRUMPET HORN

seated prevents gasoline in the cone portion of the funnel from wasting. The ball is raised from its seat by a three-arm bracket at the mouth of the spout. It is fitted with the usual screen and chamois for filtering. A new 5-gallon measure is shown, also a Tourist's oil and gasoline outfit.

Garage Equipment Co.—Auto parts and specialties, such as superior grip tire chains, garage vises and equipment, are displayed. The combination vise and vulcanizer is the company's specialty. The Economy vise and vulcanizer is a handy apparatus for garages and owners who do their own work. It consists of a combination vise, plate—which can be made hot for vulcanizing—and a concave surface for tire casings. A yoke for clamping to the plate also forms part of the vulcanizing plant.

L. C. Chase & Co.—Top material made by L. C. Chase & Co. are features of this exhibit, for the Chase brand of rubber cloth long has been used for carriage and motor car top covers. The complete line of mackintosh fabrics shows a large assortment of mohairs and worsteds with suitable linings and Chase leather, the last named a substitute for leather and offered in qualities and weights suitable for all grades of cars.

Standard Metal Work Co.—Making a specialty of manifolds, the Standard company points to the fact that it uses a high grade of silver solder for brazing the joints of copper and brass tubes, all the bends being made by a patented process so the tubes are kept round in the bend, thus giving full carrying capacity. The claimed advantage of the tube manifold over castings is that the tubes are as smooth on the inside as on the outside, creating less friction to the flow of gas and water and giving very much larger carrying capacity of the outside diameter. In the steel exhaust tubes there is no braz-

ing on steel but all joints and flanges are firmly welded in place.

Merchants & Evans Co.—By way of baggage arrangements this concern has the Star baggage carrier, which is set just back of the rear axle and beneath the body of the car. The box is usually 30 inches long, 20 inches deep and 8, 10 or 12 inches wide. It is of sheet metal, water-tight, open at the top, and supported by annular iron sides on the body frame. It is removable. The Star tool and tire case is continued, this being a metallic compartment carried on the right running board in which two tires can be carried. Within the tires are compartments for inner tubes and tire tools.



Gabriel Horn Mfg. Co.—Besides continuing the manufacture of its different types of horns of the present season, this house for next year has incorporated improvements whereby the two lower notes are operated together, making a chord, while the high note, two octaves above, gives the effect of a soprano voice. These horns are made in different sizes—No. 2 with 30-inch tubes $2\frac{1}{2}$ inches in diameter; No. 3 32-inch tube is 3 inches in diameter; No. 4 32-inch tube is $3\frac{1}{2}$ inches in diameter. A new horn is the Gabriel Trumpet. It consists of four single tubes with a small valve at the end of each tube, each valve controlling its tube. The horn is operated by four keys and all combination of trumpet and bugle calls may be played. The keyboard is fitted with a small lever which opens the four valves simultaneously, thereby producing a chord for signal purposes.

Charles E. Miller—The Testophone horn, Fig. 9, exhibited by this dealer, has four tubes of varying lengths and is worked by means of a rubber bulb which by successive compressions, acting in conjunction with a special apparatus, produces a variety of sounds resembling that of a bugle. It will give a trembling note of increasing force or a single tremble. To obtain the latter it is necessary to turn the mobile

cylinder when the piston is at the end of its course. The horn can be prevented from working by turning this cylinder when the piston is at rest.

Sireno Co.—The Sireno horn is an electric one, the sound being produced by the rapid rotation of a cast aluminum turbine which is clamped to the shaft of a small electric motor. The position of this turbine is indicated at T, Figs. 13-14. In order to make the rotation of this turbine as high as possible it is accurately machined and the armature to which it is attached revolves on two sets of ball bearings, the motor being incorporated within the body of the horn. A magnetic brake is used in connection with these horns so that the sound may be stopped immediately, this brake consisting of a magnet and an armature plunger. The normal position of the plunger is against the back of the turbine, but when the switch is pressed it is withdrawn from the turbine, allowing it to revolve; but the immediate release of the switch allows the plunger to contact with the turbine, immediately stopping it. Sireno horns are offered in all sizes from the Mile-Ahead type to the Midget. The Sireno type is intended for city and country service and has the magnetic brake. The Sireno Junior is like the Sireno in all respects except that the braking device is lacking and the horn is of a smaller size.

United Manufacturers', Inc.—In addition to its line of Jones speedometers, there is shown the Jones electric horn, in which the sound is produced by the rapid vibration of the diaphragm, and which diaphragm is set in motion by electro-magnetic means, the current for operating

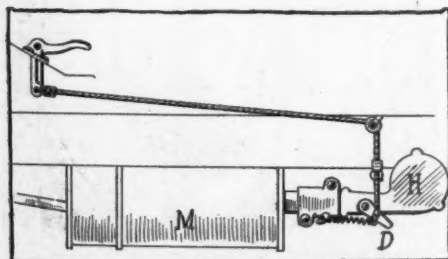


FIG. 11—JERICHO HORN

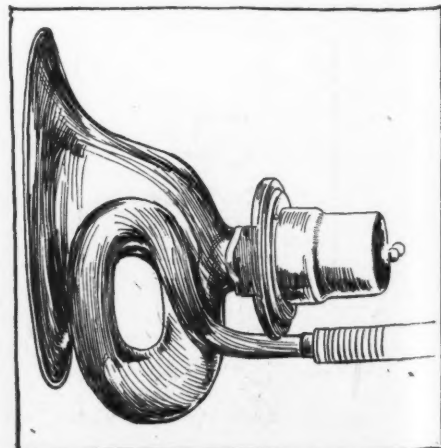


FIG. 12—JONES ELECTRIC HORN

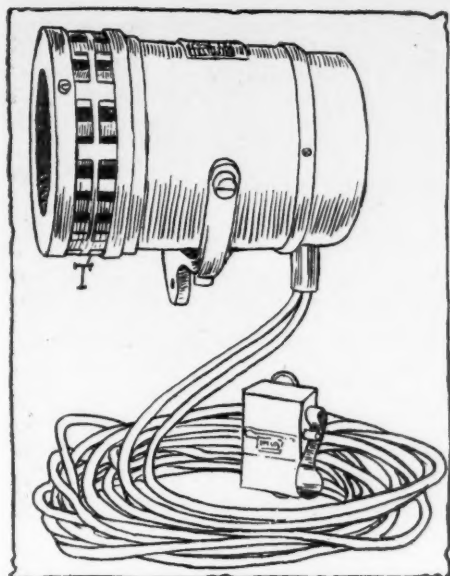


FIG. 13—SIRENO TURBINE HORN

which being taken from either storage or dry cells. The horn is controlled by a press button from the steering wheel. This horn is made in different types, with a 12-inch bell, a curved bell and a short or close coupled type.

Lovell-McConnell Mfg. Co.—This concern shows two types of Klaxon horn, one operated by an electric motor incorporated in the horn and the other the hand type. The principle of the Klaxon is illustrated in Fig. 16 and consists of a diaphragm D which, owing to exceedingly high vibration, produces the sound on the same principle that the vibration of the diaphragm in the telephone serves to transmit the human voice. The vibration of this diaphragm is by a rotor R on which are ten cams and which cams press against a hardened button on the center of the diaphragm. The rotor R is directly connected to the electric motor which revolves at 3,000 revolutions per minute so that there are 30,000 vibrations per minute of the diaphragm. The electric current for the motor is taken from eight dry cells or a 6 to 8-volt storage battery. In Fig. 15

the electric motor is located in the housing end. The hand Klaxon, Fig. 17, operates on the same principle as the electric excepting in that turning the handle drives the gear G which meshes with a twenty-tooth pinion P on the rotor shaft. By this gear arrangement and the ten-tooth rotor a high-speed of vibration of the diaphragm is set up.

Nightingale Whistle Mfg. Co.—The Nightingale whistle originally was a French idea, but the American concern now handling it has devoted considerable of its time to devising a method of attaching the device at a minimum cost. It believes that it has accomplished this and that now anyone, not necessarily a mechanic, can put on a whistle in less than an hour. This is brought about by special clamps which are designed to fit any exhaust pipe and which simplifies the attachment. The company also has the Nightingale motor cycle signal and an air compressor outfit for garage purposes.

Randall-Faichney Co.—This concern includes in its exhibit space the Jericho signal horn which it has had on the market for some time and which is illustrated in Fig. 11. This horn is of that type which is sounded from the motor exhaust and is shown in the illustration at the rear of the muffler M. The horn proper is controlled by pedal through cable connection shown. The cable connects with a swinging door piece on the horn and by which the flow of the exhaust is regulated. The horn is designed to carry the sound a good distance in advance of the car.



S. F. Bowser & Co.—The standard Bowser outfit provides for the storage of gasoline underground, and for pumping it

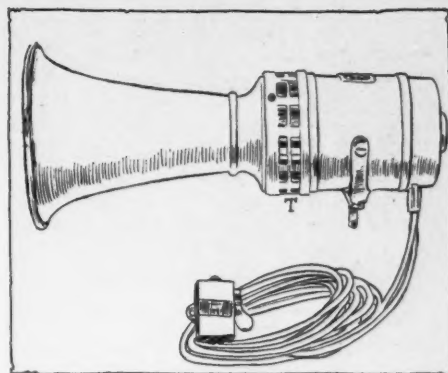


FIG. 14—SIRENO JUNIOR HORN

directly from the storage tank into the reservoir of the car. The storage tank is made of heavy galvanized steel, riveted and soldered and finished with three coats of asphaltum. As a measure of safety this storage tank is vented through the filler pipe cap to the outer air. The pump is of the self-measuring type and can be adjusted to discharge gasoline in quantities from 1 pint to 1 gallon at one stroke. Among the features to be noted for 1910 are the following: An expansion chamber which provides against any expansion in the pump cylinder; a spring lock; a discharge register, which indicates the number of gallons pumped at each operation; a two-way nozzle which enables the operator to pump gasoline into a can without the necessity of removing the hose with which the car tank is filled; a nozzle equipped with a leather shut-off to prevent evaporation and a check valve, which is purely automatic in its operation and which is placed in the discharge of the pump. For garage use, there is a 1-gallon meter which provides a check on the amount of gasoline used in any length of time. Another Bowser idea is a portable tank made of heavy black steel, which is mounted upon wheels and so carefully balanced that it can be easily moved about a garage, and which is equipped with a wheel brake. Bowser also has a nozzle gasoline filler which is connected with the gasoline pump in the storage tank and

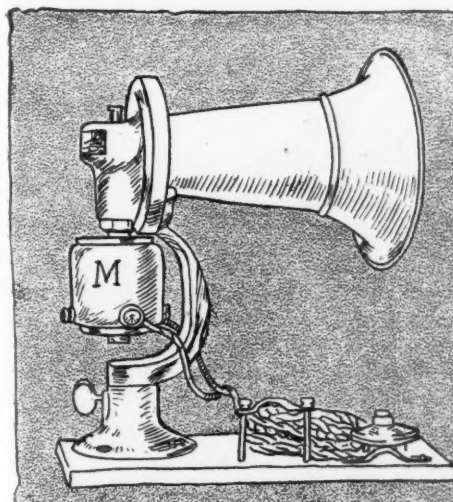


FIG. 15—KLAXON ELECTRIC HORN

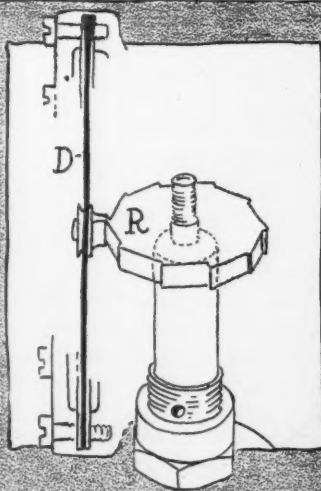


FIG. 16—KLAXON PRINCIPLE

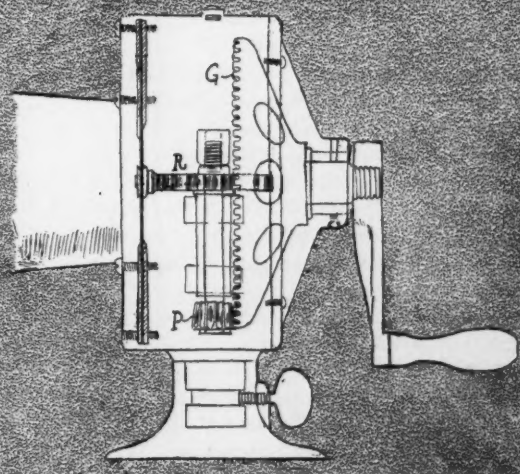


FIG. 17—THE HAND KLAXON

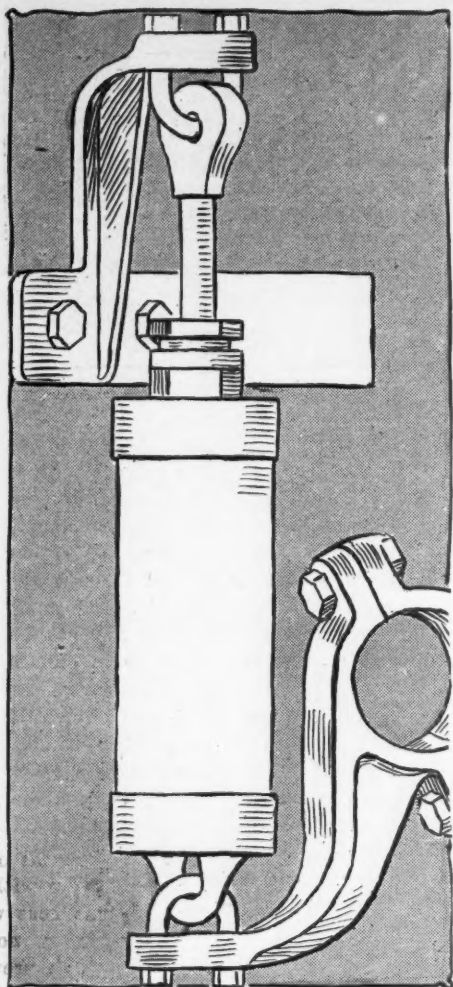


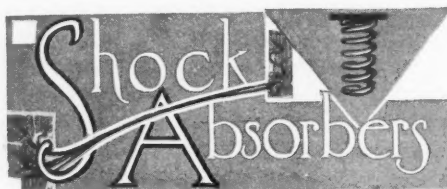
FIG. 18—FLENTJE SHOCK ABSORBER

as the gasoline pours through it the water, sand and dirt falls into a cup at the bottom and occasionally is drawn off through a pet cock.

Hydraulic Oil Storage Co.—This concern's hydraulic system has been improved for 1910 and the feature of its exhibit is its standard garage system which has a new draw-off or delivery nozzle with a flexible copper hose attachment which makes it possible for the driver to fill his car tank automatically without leaving his seat and which notifies him by an audible signal when the tank is full and siphons back into the storage tank any surplus gasoline. The tank capacities of this garage system range from 55 gallons up to 60,000. There is no regular ratio between the draw-off capacity and the tank capacity as it varies according to the different requirements. The tank exhibited has 55-gallon capacity with a flexible seamless hose and counter-balancing device and which will be typical of the entire garage system no matter what its capacity. This system does not employ any pump, but works with the law of gravity and not against it.

Wayne Oil Tank and Pump Co.—A new portable outfit is shown which is placed upon steel wheels and which has attachments including an autographic register. The tank is welded in $\frac{1}{8}$ -inch boiler plate

without a visible seam, the strength of the weld at the seam being within 5 per cent of the tensile strength of the shell. This is mounted on a frame which avoids any opening through the tank for axle equipment. The only opening in the tank is where the pump magnetic gauge and the filler pipe enter, which is intended to reduce the fire hazard to a minimum. The model H long-distance self-measuring pump has measuring stops for measuring quantities from 1 pint to 1 gallon and is equipped with a gallon meter register up to 10,000 gallons. Also it has a gallon discharge register which counts the gallons discharged from one to ten, then repeating or it may be set back to zero at will. A chamber is provided to take care of the expansion of oils under different temperatures which assures good measurement. The brass cylinder is surrounded by a heavy metal jacket which permits of a dead air chamber and protects the brass cylinder.



Hartford Suspension Co.—Those interested in the Hartford shock absorber will have a practical demonstration of the working of the device by means of two miniature motor cars, one of which is equipped with Hartfords while the other is not. Revolving pulleys under all of the wheels on both of the cars will run the tiny machines. On all of the pulleys will be two projections of uniform size which come in contact simultaneously with the wheels of the cars. At a speed of 100 revolutions a minute, each of the cars will get 200 bumps every 60 seconds, producing the same effects as regards the riding qualities of the cars as if they were going over an extremely rough road. By means of these working models, an idea of the action of the Hartford shock absorbers may be had, for it is claimed that the miniature car equipped with Hartfords will stay on the ground, while the one which is not will be in the air the larger part of the time. The mechanism of this device is operated by a small electric motor.

J. H. Sager Co.—This concern continues to exhibit its equalizing coil springs, which are inserted between the axle and car frame. These springs, as heretofore, are made with different diameter coils so that a progressive shock absorber action is accomplished. A line of bumpers also is exhibited, these being to protect the car headlight. The new type is the Ideal. A new shock absorber named the Peerless is also added to the list of exhibits.

Gabriel Horn Mfg. Co.—The new Foster shock absorber is shown. The principle on which it operates is new. The basis of

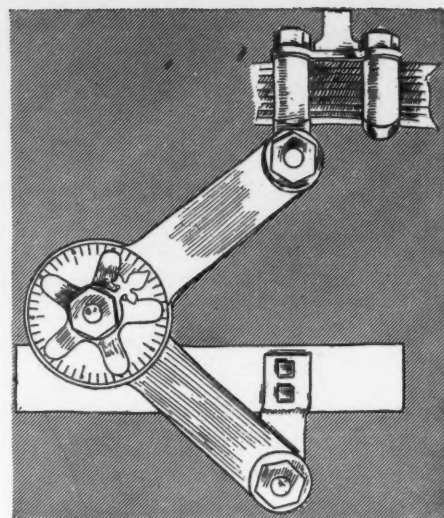


FIG. 19—HARTFORD SHOCK ABSORBER

the principle is that of an elliptical cup attached to the side member of the frame, Fig. 20. The cup is encircled by a flexible steel band lined with a specially prepared frictional material and has two integral arms by which the device attaches to the car spring. The long diameter of the cup is secured vertically on the car frame and so the shock absorber is inactive except at times when affected by shock, and the greater the shock the greater the automatic retarding force of the band on the cup. The device is protected from mud and dirt and is adjustable by tightening a bolt which passes through the two arms of the band.

Ernest Flentje—The Flentje shock absorber is a hydraulic one, glycerine being the liquid used in the vertical cylinder shown in Fig. 18. It carries several 1910 improvements. The stuffing box has been made larger and a spiral spring placed within it to eliminate undue settling of the packing. The general claim of Flentje is that no friction material is required and when the preventer is once properly set it needs no further attention, even from ordinary wear, as the hollow piston rod contains an adjustable valve, made to meet the requirements of cars having springs of different flexibility. The usual clamps and attachments for attaching the device to the car are furnished with the device.

Kilgore Mfg. Co.—The improved Kilgore air shock absorber is shown, the principal improvement being the addition of the automatic recoil check, K, Fig. 21. The principle of this absorber is that of a piston attached to the car frame reciprocating within a cylinder connected with the car axle. The piston is without valves, but in one side of the cylinder is a bypass passage, P, with an opening, O, at the end beneath the piston and another opening, E, above the piston. It is the restriction offered by this passage to the air when the piston suddenly goes up or down due to road shocks that is the shock reducing feature. In the lower part of the passage is a controlling valve, K, which has a cir-

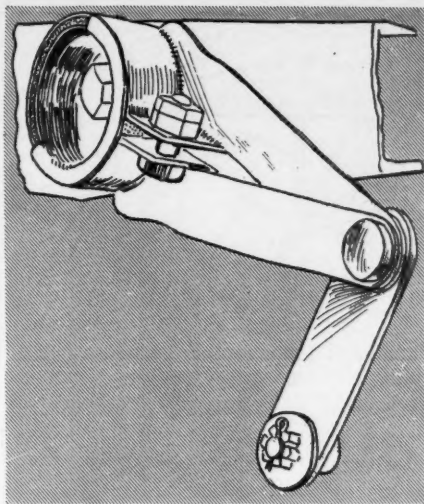


FIG. 20—FOSTER SHOCK ABSORBER

cular opening at the point, O, so that by turning the valve the size of the opening, O, can be varied, making the opening small when severe shock reduction is desired and leaving it open if slight shock reducing action is desired.



Excelsior Motor and Mfg. Co.—This concern has made its debut as a maker of motors with four cylinders of the L type, cast in pairs, and having $4\frac{1}{2}$ -inch bore and $5\frac{1}{4}$ -inch stroke. The lubricating system of these is an internal circulating one with an oil pump located within the crankcase and delivering oil direct to the important bearings. A part of the motor is a multiple-jet carbureter; these motors are of the regular water-cooled type, with ball-bearing fan fitted. The workmanship throughout is standard, and many special tools have been installed to facilitate manufacture. The half-time gears at the forward end are entirely inclosed and the water pump and carbureter are on the right side, and the magneto on the left, or valve side. The motor is carried on four points of support. A tubing is incorporated with it in which the high-tension leads to the spark plugs are carried.

L. A. W. Motor Co.—This concern shows self-firing, air-cooled, two-cycle, six-cylinder rotary motor of 30 horsepower, having $2\frac{1}{2}$ -inch bore and stroke. The motor is self-firing in that each explosion fires the succeeding charge through a small passage in the stationary supplying cylinder, this passage being uncovered immediately after the firing of each cylinder. The explosive charge is admitted to the cylinders through a port in the supply cylinder, which is uncovered immediately the exhaust has been uncovered.



Cramp & Sons—In this stand is found the parsons white metal for bearings and manganese bronze materials. Such articles as axles, lamp brackets, engine frames, etc., are shown in great variety as well as samples of parsons white brass bearings as cast for Packard, Locomobile and other cars.

Isaac G. Johnston & Co.—This concern makes a specialty of steel casting and motor car parts. Numerous articles showing great strength are on exhibition in comparison with drop forgings. These castings are credited with showing a remarkable faculty for bending without fracture, which examples of cold bending of cast steel in elongated forms and otherwise merits attention. Monel non-corrosive metal also is a specialty of this firm. This is an alloy of nickel and copper, and many uses for it are shown.

Light Mfg. and Foundry Co.—This company displays castings in both aluminum and bronze. Its motor car brand exhibit is the more interesting because the castings are shown in the several stages. The company also shows a very light casting for aerial purposes, for which it claims the market is rapidly increasing. Its plastic bronzes are featured.

Vanadium Metals Co.—Vanadium is on the increase. Non-corrosive vanadium products are strong and light and makers have found many uses for parts made of this metal. The Vanadium Metals Co. shows numerous articles made of its specialty such as axles, crankcases, crankshafts, bearings, etc. Victor vanadium non-corrosive materials also are shown in great variety.

Standard Welding Co.—This concern shows its line of clincher rims for motor car wheels as well as the varied lines of quick detachable rims for the different tire makers. In addition to its line of rims of all natures for motor cars it shows various types of rims for motor cycles.

Metal Stamping Co.—This concern exhibits in addition to a line of horns of various patterns a new style of windshield and regular motor car hardware such as robe rails, foot rests, tire holders and lamp brackets.

Diamond Chain and Mfg. Co.—A full line of chains will be on view. This firm is essentially a chain concern and will exhibit a new line in the way of a detachable chain besides its riveted products. This year it also reports the manufacture of two new pitches— $1\frac{1}{4}$ and $1\frac{1}{2}$ -inch. These new pitches are turned out to supply the truck business, which is rapidly increasing in volume. The assortment

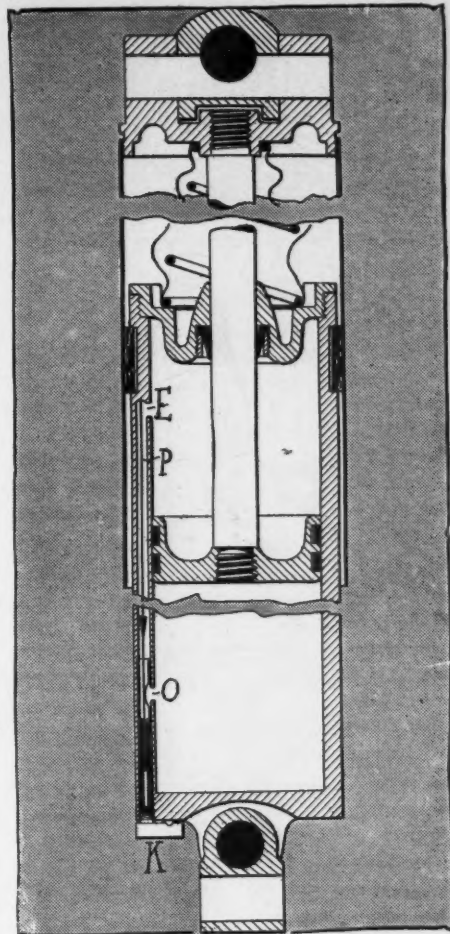


FIG. 21—KILGORE SHOCK ABSORBER

shows great variety, ranging from the high-wheel car chains to the heavy truck product.

Whitney Mfg. Co.—The Whitney Mfg. Co. has a full line of its roller chains in both the detachable and rivetted type. A rivetted roller chain, with safety connecting link for motor cycles, also is made. This chain is especially made for use on lighter vehicles. The Whitney 1-inch pitch block bicycle chain and Whitney chain belt will be shown with other Whitney products.

H. W. Johns-Manville Co.—Mobiline is an asbestos packing having fine brass wires intertwined in each strand and designed to withstand the high pressure and temperature of gasoline motor works. It is one of the lines exhibited by the H. W. Johns-Manville Co., which also shows another asbestos product, its Non-Burn brake band lining. Another specialty is Leak-No, a chemical compound resembling powdered iron which is used for repairing iron and steel. When mixed with water and applied like putty to defects in cylinders, radiators, pipes or anything made of iron or steel, it is said that it metalizes and becomes a part of the article to which it is applied, repairing cracks, spongy spots, sand holes, blow holes or other defects. Other products are dry powder and chemical fire extinguishers, asbestos wood, asbestos roofing and siding and motor car friction tape.

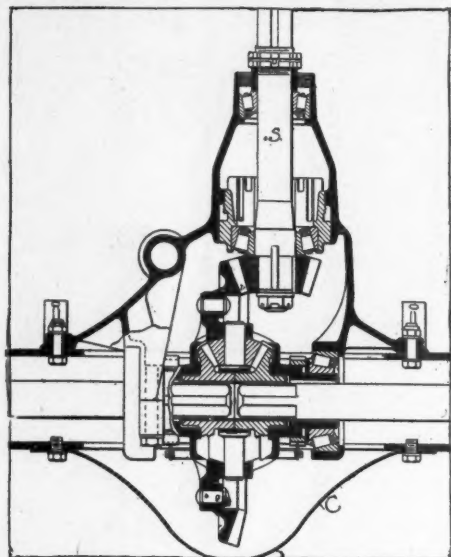


FIG. 1—TIMKEN REAR AXLE

McCue Co.—This concern shows its full floating type of rear axle, which is fitted throughout with annular ball bearings and self-adjusting thrust bearings at one side of the differential. The driving shafts have integral hub clutches at the other end and are made of 45-carbon heat-treated steel. Double brakes both of the expanding type are fitted, one set operating in 14-inch drums, the other in 10-inch drums. This axle is furnished with a spring seating made either to swivel on the bushing on the housing or to keep permanently to the axle.

Timken-Detroit Axle Co.—This company is manufacturing two sizes of rear axles for next season—one for cars weighing 2,500 pounds, with a horsepower rating up to 35, and the other for 60-horsepower cars weighing 3,200 pounds. The general design of both is alike, these differing only in size. The pressed steel housing is made of a special analysis of steel, and the differential group can be removed by detaching the cover, C, Fig. 1, without disturbing the remainder of the axle. This axle carries a bevel-gear differential supported on Timken bearings, and the propeller shaft S is carried on two races of these bearings, so that there is little chance for improper meshing of the pinion on this shaft with the differential gear. By making the differential housing and the axle sleeve in one piece of pressed steel, a compact appearing axle is furnished and the external truss rod is avoided. The axle driveshafts are of squared ends where they enter the differential gears, and may be withdrawn through the wheel hubs to permit of removing the differential. Short series

Timken bearings are used, those supporting the differential being adjustable by collar nuts, and the mesh of the gears may be varied by this adjustment and by the nut which contains the cup of the bearing at the rear of the pinion. The brakes fitted to this axle are internal and external, the internal shoes expanded by wedge. The external brake is a spring steel band. Alloy steel is used in all parts of this axle.

Royal Equipment Co.—Raymond brakes, Duplex brakes and Raybestos and Stability friction facings are displayed. The Duplex brake is a new design put out by the Royal Equipment Co., which is intended for use on machinery and vehicles where the braking effect is relatively large compared with the operating force, the effect being, it is said, equally efficient in both directions of the rotation of the drum. This is accomplished by the wrapping or winding effect of a flexible band surrounding and in contact with a rotating drum. One end of the flexible band is fixed, while the operating force is applied to the other end in the direction of the rotation of the drum. In order to secure this effect in both directions of the rotation, means are provided by which either end of the band automatically becomes the fixed end, depending upon and in proper relation to the direction of the rotation of the drum.

Hess-Bright Mfg. Co.—This pioneer of annular ball bearings in America has added to its line two new types of thrust bearings, one being the double thrust and the other an improved type of single thrust, the latter belonging to the K-U series. This bearing consists mainly of the regular thrust, but is also provided with spherical seating washer of advantage in allowing the bearing to be assembled between two flat surfaces, thus eliminating the necessity of cutting a spherical seat in the bearing housing. The component parts are held together by an outside casing allowing bearing being handled as a unit. The double thrust bearing is designed to take thrust in both directions, and is composed of one center rotating race, to rolls of balls in cages,

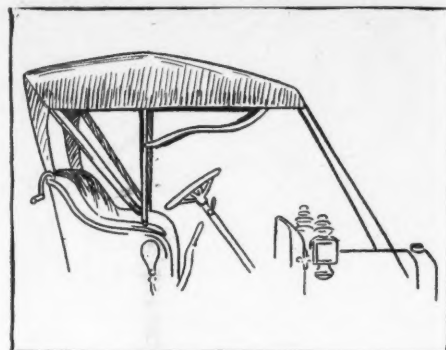


FIG. 3—SPRAGUE TOP

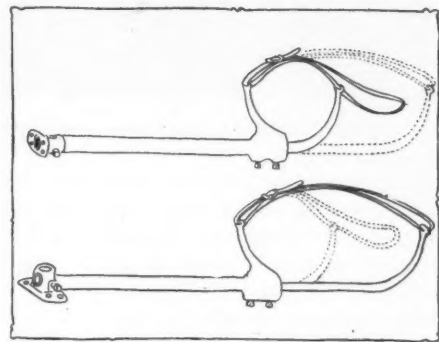


FIG. 4—GARAGE EQUIPMENT TIRE IRONS

and two spherical seating races. An improvement has been made in the type of separator used in the radial bearings. This is known as a brass stamped separator. The foundation of the separator is laid upon a solid stamped ring of sheet brass and each ball is held in an individual pocket of U shape. The uprights of the pocket are of L section, each pocket being secured to the base ring by the edges of the latter being pressed over the connecting arm of the U. After the separator is put into the assembled bearing the uprights are pressed over the balls, giving almost a complete surface around the ball circumference, this pressing being done so as to allow a running clearance between the balls and the ball pocket. This type of separator does not require any screws or rivets.

J. S. Bretz Co.—A full line of F. & S. annular ball bearings is shown by this concern. No new types or models have been brought out. The present line being of the single and double annular type, as

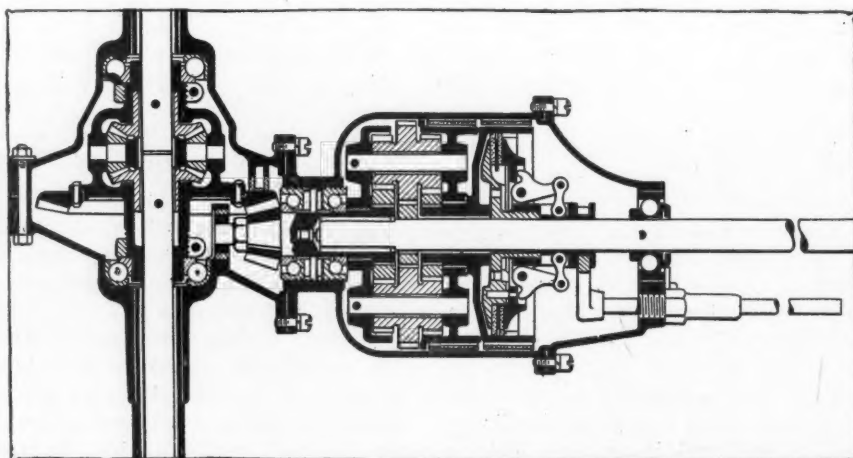


FIG. 2—MUNCIE GEAR WORKS REAR AXLE

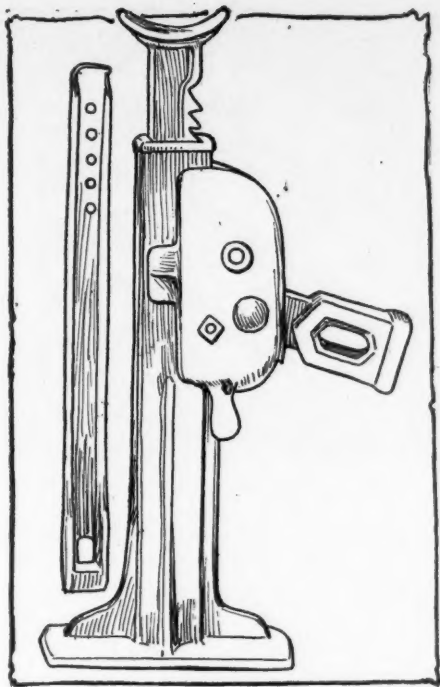


FIG. 5—OHIO RATCHET JACK

well as the special bearing for magneto use. The separator used for these bearings which is unaltered, permits of a full race of balls, less one, which is compensated for by the total thickness of the separator walls between the adjacent balls. F. & S. bearings are, as always, made with diagonal side entering slots, which slot is slightly smaller than the size of the ball. The balls, therefore, are sprung in under pressure. These bearings are made interchangeable with all others of the same type. The F. & S. separator is a two-part, die-cast design with pockets on the opposing sides for containing the balls. The halves are secured together by counter-sunk binding pieces. In the double annular type the balls are accommodated in the opposite faces of the retainer. The magneto type has a special style of separator, so constructed as to hold the balls in their proper position on the inner race, which facilitates assembling. In mounting this bearing the outer race is pressed

tightly into place in the housing, whereas the inner race is given a light drive fit on the shaft. This bearing permits of considerable endwise movement, which is claimed to be desirable in supporting armature shafts. Also exhibited is the Bowden patent wire, which is suited for connections to brakes on cars as well as for ignition and throttle controls, muffler cut-outs, or auxiliary air control. This wire mechanism consists of two parts—a closely coiled and practically incompressible spiral wire constituting the outer member, and an inextensible wire cable within it and constituting the inner member.

Warner Gear Co.—This concern exhibits a complete line of transmissions of different types, one style having the multiple-disk clutch incorporated as a unit with it, although mounted in a separate housing. The clutch is of sixty-five heat-treated disks of saw-blade steel and rotates in an oil bath. The steering gear is of the worm-and-gear-type are shown for pleasure cars and commercial wagons. These have stationary throttle and spark control above the steering wheel, and the steering gear is provided with an outside adjustment. Differentials of the bevel and spur type are shown.

Cotta Transmission Co., Inc.—The Cotta transmission is practically the same as exhibited a year ago. It has three forward speeds and has the main and countershaft gears always in mesh. On the mainshaft there are two sliding clutches with faced teeth which interlock with corresponding teeth on the gears, thus clutching the desired gear to the shaft. The set is, in brief, an individual clutch type.

Muncie Gear Works—This concern exhibits an exhaustive line of jackshafts for motor buggy work, in which the gearset is a corporate unit of the shaft, planetary gearset, sprockets, combination rear axles and both planetary and sliding gearsets. One of the latest designs of this type, Fig. 2, is its No. 35 jack-shaft for motor buggy work, which has formed with it a planetary gearset carried on ball bearings,

Rear Axles

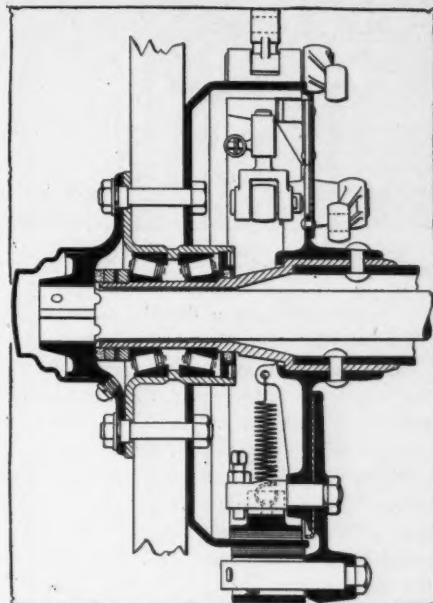


FIG. 7—TIMKEN BEARINGS IN WHEEL

which bearings are used for supporting the differential. Hyatt rollers take this work on the rear wheels. A specialty of this company is a wheel brake for motor buggy types which can be fitted to square section axle. These brakes are in several sizes, two being drums 10 by 1½, and 8 by 1½, and designed for axle of square section from one to 1½-inch to the side.

Merchant & Evans Co.—This exhibit includes the Hele-Shaw clutch in all sizes to 100 horsepower for motor cars and trucks. This clutch has corrugated disks by means of which the friction area of the plates is increased, and which also permits of reducing the spring pressure for engagement purposes. The company also has the Evans combined rear axle and gearset, the axle being of the floating type and the transmission with three speeds forward, two of which give direct drive, which is accomplished by a double differential bevel gear and double bevel pinions on the shaft. The company has a line of front axle forgings of the Lemoigne and other types.

Joseph Tracy—This New York engineer shows a fan dynamometer for testing engines of motor cars, it being possible to make the test with the motor in or out of the car. The dynamometer consists of horizontal shaft carried on two races of ball bearings. One end of the shaft carries a two-bladed fan, the position of the square blades being changeable. The other end of the shaft connects through a universal joint with the crankshaft of the motor under test. A special tachometer is belt-driven from this shaft. The face of

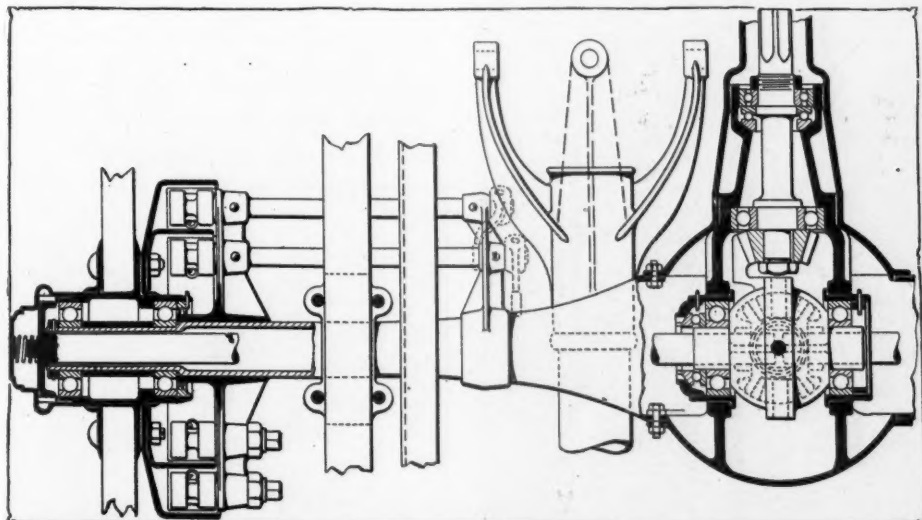


FIG. 6—FULL-FLOATING TYPE OF REAR AXLE

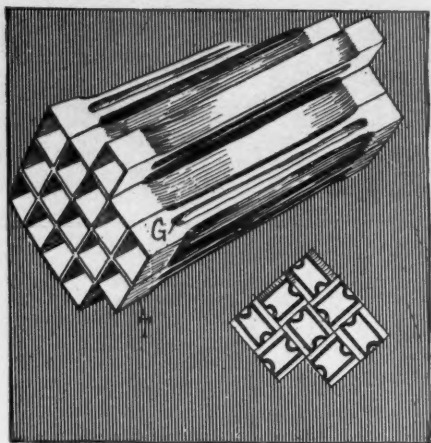
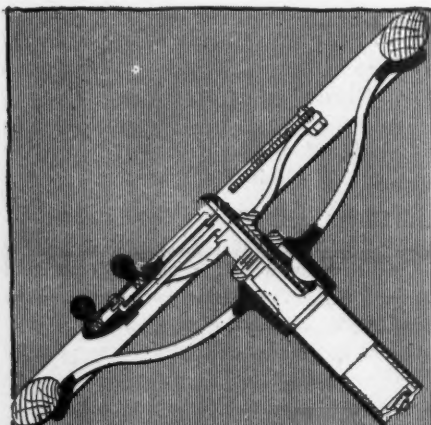


FIG. 8—BRISCOE HONEYCOMB RADIATOR

this tachometer has a double scale but a single pointer. The inner scale shows the revolutions per minute of the motor crankshaft, and the outer scale, the horsepower developed. The revolution-per-minute scale is progressively graduated by divisions of 20 from 200 to 2,000 revolutions per minute. The horsepower scale gives a minimum rating of 1 horsepower at 480 revolutions and a maximum of 70 horsepower at 1,980.

Gemmer Mfg. Co.—This concern has three types of steering gears for the coming season. One, Fig. 17, is a worm-and-



pinion design with plain bearings for the wormshaft. The worm keys to the steering column and a taper pin is fitted in a taper hole through the shell of the gear and the tube to prevent the worm floating off. The pinion is keyed in place and the radius arm is a square fit on its shaft. Phosphor bronze bearings are furnished. Fig. 11 illustrates a more expensive gear of the worm-and-sector type and in which races of ball bearings are shown above and below the worm. The sector is a keyed fit on its shaft. This gear is intended for cars weighing up to 4,000 pounds. In addition to these types the company makes its original Gemmer gear in which a sleeve with a right hand thread outside and a left hand

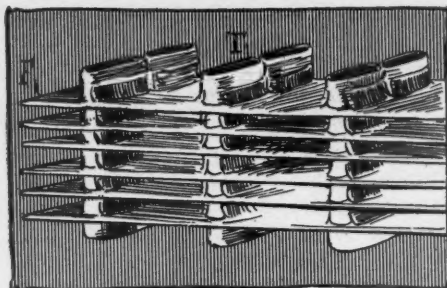


FIG. 9—BRISCOE TUBULAR RADIATOR

thread inside engages nuts so that a movement of the wheel works the nuts in opposite directions up and down. These in turn bear on pivot blocks which transmits to a rocker shaft and on this rocker shaft is a radius arm.

Westchester Appliance Co.—One of this concern's exhibits is its No. 14 windshield, which is of the folding type. It is made with a tubular brass framework and has a self-locking device to hold it in the desired position. A line of gas lamps for motor cars is shown. These are constructed of heavy gauge brass, adjustable gas attachments, and Mangin ground glass mirror reflectors. These are in three sizes—7, 8½ and 9¼-inch front diameter. The generators are designed for attachment to the running-board of the car instead of, as formerly, to the frame. The company has a complete line of supplies, comprising lamp brackets, coils, batteries, terminals and cables, spark plugs, metal tool and battery boxes, tool kits, steering wheels, tire covers, oilers, foot rests and various other lines.

Briscoe Mfg. Co.—This concern has several types of radiators for 1910. One of the oldest is the vertical tube continuous fin type, Fig. 9, in which the flat vertical tubes T pass through a series of horizontal fins F, which are flanged upward alongside the tubes. Because of these flanges closer contact is established between the fin and the tubes and the tube's ability increased.

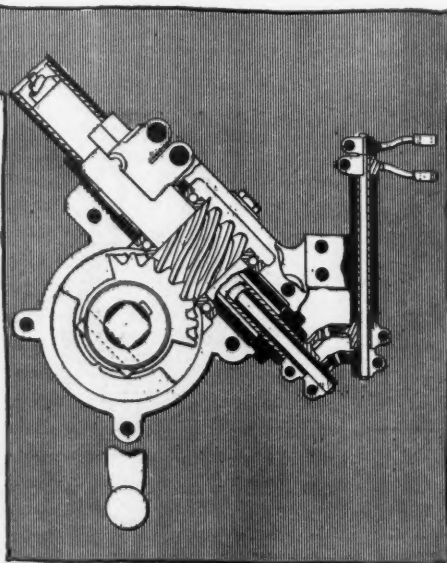


FIG. 11—BALL-BEARING GEMMER GEAR

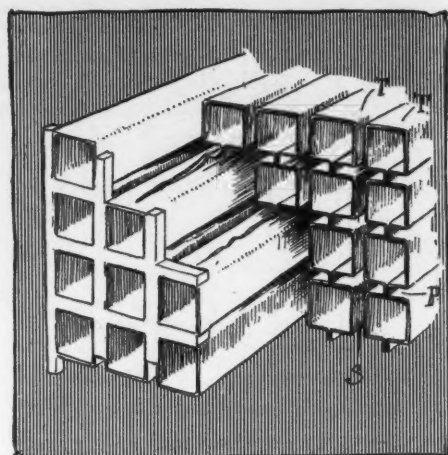


FIG. 10—BRISCOE TUBULAR RADIATOR

This continuous radiator is made with two or three water tubes deep according to the thickness of radiator required. Another type is the Detroit honeycomb tube radiator, Fig. 10, which is of the square tube style, the water passing through vertical spaces S between adjacent rows of tubes T and also filling the short horizontal pockets P which extend laterally between adjacent upper and lower air spaces. The new Briscoe 1910 radiator, however, is an out-and-out honeycomb type of which Fig. 8 is a sectional illustration. This illustration shows how the corners and sides of the square air tubes T are pressed, thus leaving water spaces around the tubes, so that in its circulation the water can work from the upper to the lower tank. The small depressions or grooves G along the faces of the air tubes are also shown, and it is these that give the water capacity to this radiator.

Perfection Spring Co.—Flat leaf springs of various types and models in both orthodox and patented types are shown by this Cleveland concern which also exhibits several springs dis-assembled with the idea of illustrating the detailed construction of the device. All these springs are hand-fitted and oil-tapered and made of such material as crucible, Krupp silico manganese and crucible chrome vanadium steels. A feature of the 1910 product is that all eyes in the main leaves are reamed to exact size and when desired are supplied with oil holes drilled or tapped.

McCord Mfg. Co.—This concern is making but one type of radiator, which is of

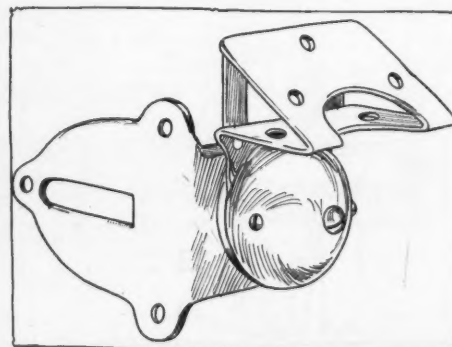


FIG. 12—STEWART SPEEDOMETER BRACKET

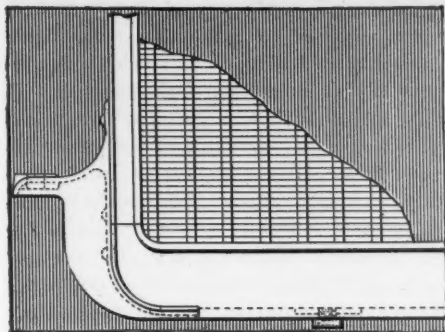


FIG. 13—McCord Fixed Radiator Support

the vertical tube type with continuous horizontal fins. The McCord radiator differs from many of the other tubular types in that a round tube instead of a flat one is used. The manufacture of this round tube is illustrated in Fig. 14, which shows how the joint is accomplished by lapping the adjacent edges over and flattening them, thus making a stout job. The vertical brass tubes $\frac{1}{4}$ inch in diameter extend through horizontal fins or plates which extend from side to side of the radiator and are spaced $\frac{1}{8}$ inch above one another. The fins and tubes are brazed together. The company is manufacturing a great many thermo-syphon circulation radiators for such concerns as Regal, Empire, Elmore, Hupmobile and in most of the cases an intermediate water tank is incorporated which does not extend through to the front of the radiator. This tank maintains the head of water desired. McCord radiators are made with different forms of support—one illustrated in Fig. 15, having a trunnion T at each end giving a rocking support on the frame, whereas that in Fig. 13 is a rigid support.

Sprague Umbrella Co.—An interesting 1910 offering of this well-known top and windshield concern is the new air-cushion Leader windshield, the folding nature of which is illustrated in Fig. 9. The upper half, shown tilted, works on a double hinge, one at A, the other B, which allows of it being set in four positions. For frosty or stormy weather the upper half can be tilted, giving a clear space for vision between the halves, and in muggy weather the upper half is tilted back, permitting freer air circulation. The framework is special brass tubing and the glass is mounted to avoid rattling. For those demanding a cheaper article Colonel Sprague has brought out another type in which the

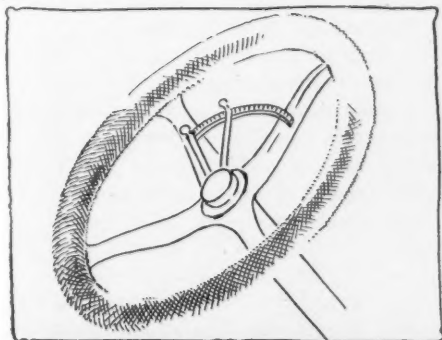


FIG. 16—Rubber Steering Wheel Cover

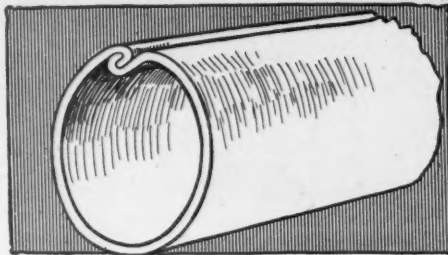


FIG. 14—McCord Radiator Tube

double hinges is eliminated, but in which the upper half when folding throws the lower part forward, returning it to an upright position as the sash is completely folded. Two tops are specialized for the approaching season. One is a four-bow type for touring cars and in which the front bow engages the third one so that it does not interfere with access to the car. This top, Fig. 19, is trim and shapely. Another top, intended for runabout cars, is shown in Fig. 3. It is of the three-bow design with the front bow hinged to the middle one to afford ready access to the seat.

Moller & Schumann Co.—In offering its product for the inspection of the motoring public, the Moller & Schumann Co. has planned an exhibit made up of a variety of finishing varnishes which have been especially designed for motor car finishing. It is claimed that these varnishes resist the action of grease, oil and dust. Solid-color rubbing varnishes are offered in three colors—light, medium and dark in red, yellow and green.

Standard Leather Washer Co.—A full line of Gray's motor necessities are displayed. The new rubber-covered steering wheel, Fig. 16, merits close scrutiny, inasmuch as it is covered with a soft, durable, pliable rubber, which gives a firm grip, at the same time retaining strength and durability. A collapsible or folding tool box also will be shown. This box enables a driver always to have his tools before him

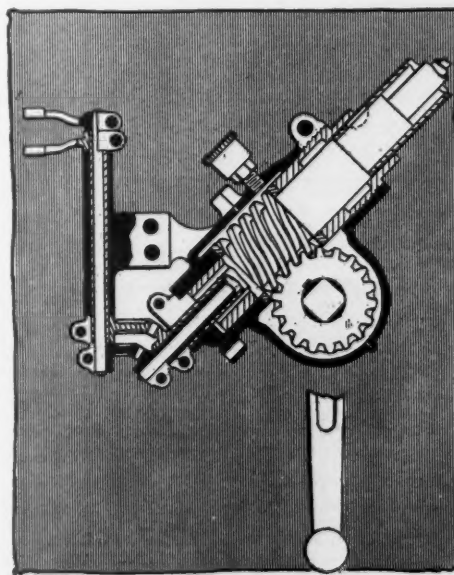


FIG. 17—Plain-Bearing Gemmer Gear

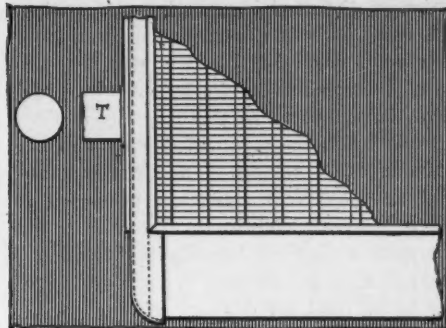
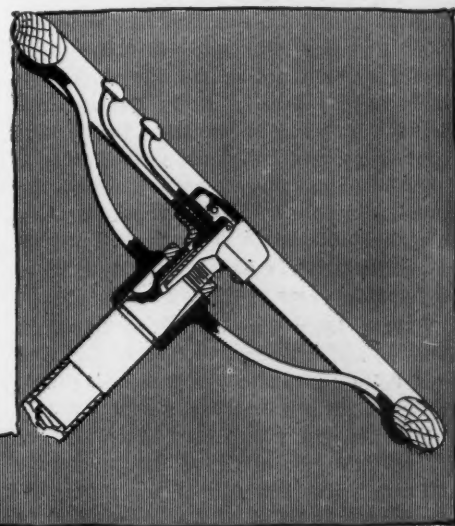


FIG. 15—McCord Trunnion Support

and does away with the necessity of laying them out on the running board or dash. Other specialties will be shown in great variety.

Emil Grossman—Among the many accessories exhibited at this booth is the Red Head spark plug of the magneto type, which is made for all sizes with porcelain or mica insulation. Red Rib cable for motor-car and gas-engine ignition work is shown, as is the swivel-action bumper for front and rear of cars. It is now made of malleable steel throughout, and the bar is connected by two swivel joints to levers that work in slotted sleeves against flexible spiral springs. The springs absorb the shock of direct collisions and the swivels' angular jars. For use on motor



car tops is a phosphor bronze cable to take the place of leather straps. A reel is attached to the top and the cable is fastened to the frame with a snap hook.

Badger Brass Mfg. Co.—This lamp house is bringing out for next year a combination gas and ray-deflector headlight, which has been designed to suppress the blinding rays from headlights. This device enables the motorist, when meeting another car or vehicle on country roads or in cities, to suppress at will from his seat the dazzling effect of the light. This is accomplished by raising the flame of light above the focus of the reflector, which bends the long-distance beams of light

down on the road immediately in front of the car. This is accomplished by a Bowden wire control from the steering post to a lever on one of the headlights, which lever is connected to the other by a piano wire. When released the tip or flame is lowered by a spring to a focus position, and the beams of light are projected in their original horizontal direction. The company's line of headlights includes a combination gas-electric type, allowing of gas being used for country driving, or the electric bulb swung in and locked into focus for city use, without disturbing either the wiring or gas connection. The electric bulbs are 12-candlepower, 6-volt Tungstens. The company continues its line of electric and oil side lamps; it has a special taxicab oil side light, and the usual line of rear lamps of square and round types.

Keystone Lubricating Co.—One of the new features at this booth is the new Keystone oil for use in motors and which is being marketed for next year, in addition to the standard line of Keystone greases. This oil is manufactured in two consistencies of light and medium grades. The light, clear oil is suitable for air-cooled motor cycle and high-speed motor work. The medium density oil is for standard cars of water-cooled type. The company has eight different densities of greases, all of which are made from pure Pennsylvania petroleum crude by the Keystone dry-heat process. Of these eight densities three are suited for motor car work. No. 1 density is for grease cups; No. 2 for bearings of the Timken and Hyatt type, and No. 3 for gearboxes, differentials, timing gears on the motor, universal joints and ball bearings on axles. In the exhibit booth is a Mitchell gearset and differential in which two densities of Keystone greases are being used.

Warner Mfg. Co.—A line of transmissions of all kinds and especially the kind that bolts to the rear axle making unit construction possible are shown by this Toledo concern which also has a line of differentials principally of the bevel type and also a steering gear of the worm-and-sector type and a line of selective control levers, the last named being manufactured by the T. W. Warner Co., of Muncie, Ind.,

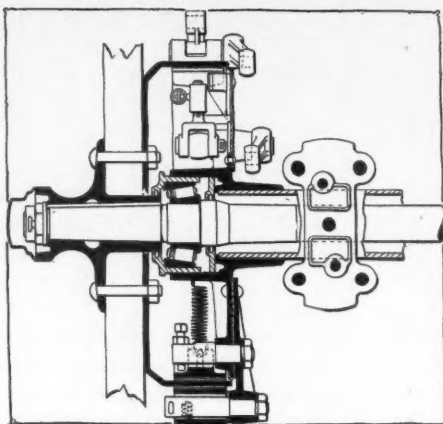


FIG. 18—TIMKEN AXLE BEARING

which is owned and controlled by T. W. Warner, who also is president of the Warner Mfg. Co.

International Engineering Co.—This concern is importer of R. B. F. ball bearings, one leading type of which is suitable for wheels, which is made in three sizes, for spindles of 35, 40 and 45 millimeters in diameter. These bearings are of the self-contained type. By way of thrust bearings a type is furnished with a self-contained spherical seat, which obviates the necessity of machining a seat of this form, and all that is necessary is to machine an ordinary flat seat.

John A. Salman & Co.—Monograms and letters in sterling silver gold and other metals for use in the motor industry are shown by Salman & Co., who display their new 1910 line of belt pins and buckles, monograms and initial fobs as well as motor car names. This company has just put special machinery into its plant for use in the manufacture of motor car names and this, it is expected, will enable it to fill orders more promptly during the coming season.

Janney, Steinmetz & Co.—Among the offerings of this Philadelphia concern are two sizes of gasoline storage outfits which it will have ready for delivery the latter part of January, but models of which are displayed. These outfits have tanks of 55 and 110 gallons capacity respectively, the tanks being made of steel plates, welded seamless. In addition to being galvanized by the hot process, they are coated on the

outside with two coats of anti-corrosion paint, designed to make them free from possibility of leakage. In addition to the necessary tank fitting, each outfit has a small direct lift brass gasoline pump, for use directly over the tank, or with a larger pump of similar design for use when the tank is located some distance from the pump. Both of these types of pumps are self-draining. The company also has the Flash Light spark plug, the firing points of which are of platinum iridium wire, which are set into the firing chamber so they cannot be injured in any manner should the plug be dropped on the ground. The porcelain is specially heat-tested and so seated as to be protected from damage unless by deliberate intent.

Timken Roller Bearing Co.—This company exhibits three complete series of the Timken long type, the Timken short type and the Timken annular replacement type. These bearings are suited for front axles, rear axles, gearsets, jackshafts, pinion shafts, steering gears, steering knuckles, clutches, fans, etc. The Timken short series can be used in the place of the standard annular ball bearings.

George A. Haws—Panhard oils, as shown by George A. Haws, will be more attractive than ever this year. The check-board design can—well known as Panhard oil property—is carried out in a much neater manner for 1910, by way of an improved can and a better appearing label. The oils are light in color and at the same time of heavy lubricating qualities.

William P. Miller's Sons—William P. Miller's Sons are now making Pan-O-Lite oil in three weights. The original Pan-O-Lite oil now is known as heavy Pan-O-Lite oil. Their usual line of greases, etc., including the Excelsior fibrous oil, will complete their exhibit.

Duffy Grease Co.—The Duffy Grease Co. will have its gear grease in actual use. The practical demonstration of the action of Duffy grease in a gearcase will attract attention because it is instructive.

Adam Cook's Sons—Albany grease, made by Adam Cook's Sons, will be shown in practical use. This firm will have an attractive stand and show their greases for every form of mechanism. It is one of the pioneer firms in supplying motor car lubricants.

Havoline Oil Co.—The Havoline Oil Co. will exhibit a full line of the Havoline oils and greases, including such lubricants as it manufactures for the Packard company. It also will show a line known as Havoline crystal oils which are of the water-white variety of light engine oils.

Fisk Rubber Co.—The Fisk Rubber Co. exhibits its complete line of tires and rims, which includes the bolted-on type of tire in conjunction with this demountable rim, as well as clincher, Dunlop and quick detachable clincher type.

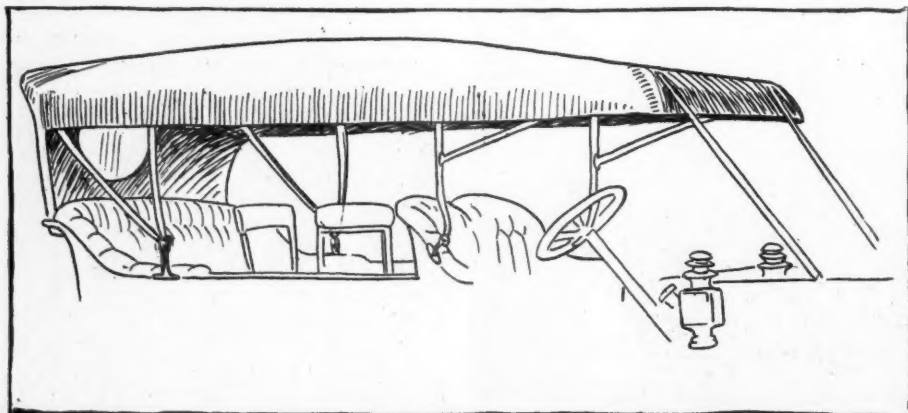


FIG. 19—SPRAGUE TOP FOR TOURING CARS

CARE AND MANAGEMENT OF PUBLIC GARAGES

By W. H. Shay

THE management of a public garage involves so many problems that discussion of them may be of value to some of the many who are venturing into this new and constantly broadening field. To commence with, the management of a public garage not only means the successful handling of a complex business but also involves the use of far more tact, education and intelligence than is requisite in any other line so closely identified with mechanics. Technically, the car owner pays you to house his machine, supply gasoline and oil and keep his car clean and in running order, but he who stops with that misses all the finer points of his position and earns no place in the regard of the owner.

The ownership and operation of a motor car involves a considerable money outlay, and as a rule marks the owner as a man able and willing to pay well for that which he desires in the way of recreation or luxury. The sharp business competition of the larger cities especially has taught the man of money to recognize and respect brains and ability in those with whom he comes in business contact, and the relation between the garage manager and his owner-patron necessitates a higher order of intelligence than is required merely to repair a motor or replace a tire.

Neatness a Necessity

A workman is known by the way he turns out his work and the way in which he keeps his tools. A garage manager is known by the appearance of his garage and the way in which he looks after the interests of his patrons; therefore keep your garage neat, clean and have definite and accessible places for all its equipment. Allow no moving of cars from place to place in the garage by engine power—always insist on their being moved by hand. Do not allow cars to be moved by pushing or pulling at the radiator, top, lamps, fenders or windshield braces. Handle them by the bumper or by the wheels.

See that the cars are not only clean and tanks filled before being sent out but also that no careless mechanic has soiled the cushions by contact with greasy hands or overalls. Personally inspect cars before they go out to see that the Prest-O-Lite tank has not been exhausted, that the hood and top fastenings, doors, etc., are secure and that everything in sight is as it should be. In case the weather is bad, or the car is going out for a long trip, see that the curtains, robes and dusters are in the car and in order, that the extra tires and tubes, the chains, tools, etc., are all in their proper places and in working order.

Look Out for Squeaks

A loose bolt, screw or strap frequently occasions a rattle or squeak which irritates the owner but which he refrains from mentioning for fear he will be con-

sidered a kicker or a crank, and so his annoyance increases while he is waiting in the hope that it will be discovered and remedied. The manager who is able to make his patron feel that he has a personal interest in the satisfaction the car gives will be able to learn of these little annoyances and correct them before a discontented spirit takes hold of the owner. Being constantly on the lookout for the little things one can do in the interest of the owner, and for which no extra charge is made, he will come to depend on the manager in a way which will hold his business when some rival garage offers him service for less money, and even if he goes the rival must treat him better than you did or he will return, bringing others with him.

The owner who knows that a careful, painstaking man is looking after his interests in any given particular has no hesitancy in recommending that man to his friends. Knowing that he is treated fairly, your patron will not only have confidence in your recommendations for necessary equipment and repairs but he will feel that your bills are reasonable, will settle them without quibbling, and will cheerfully allow you the legitimate profit on needful equipment instead of allowing it begrudgingly or shopping to see where he can buy motor supplies the cheapest.

Be alert and on duty at all reasonable times. Be particular in the quality of

DOCTORS ASK PRIVILEGES

Boston, Mass., Dec. 27—Boston physicians have at last taken the initiative toward getting the privilege of driving their motor cars on different streets affected by the new traffic rules and also getting the right of way when on hurry calls. A petition signed by more than 300 physicians in active practice has been received by the Boston street commission, asking that body to amend certain regulations for the benefit of the doctors. They claim that many lives might be saved by physicians reaching a person quickly, where now valuable time is lost because of the rules. The question of physicians getting the right of way has been brought up in many cities since the motor car has replaced the horse, but there has been objection to granting doctors any exemption, because it was felt that some of them would abuse the privilege under the guise of professional calls. Much interest will be aroused by this petition, and its results will be watched everywhere. The commission will grant a hearing shortly.



your help. Insist that work done be charged to the proper account and allow no workman to charge time to any machine unjustly, for it is not honest and absolute honesty pays best always. If workmen will cheat one owner to favor another they will cheat you, and when discharged will hasten to your patrons with tales of what has been done, claiming your sanction for the same. Allow no tools to be removed from cars for use in the garage. When any car goes to the repair department list all its equipment in duplicate, giving one list to the owner, that there may be no misunderstanding or claim for tools or equipment when it is turned over to him again. Do the same when accepting a car for storage.

Always Use System

A garage represents a large permanent investment, and every detail of its interests should be closely watched. Know where supplies can be secured the cheapest, what work can best be sent outside and how long it will take to have it done that you may be able to tell the owner about when he can get his car, if no new trouble turns up, after he has ordered it to the repair department. Never undertake extra repairs of any consequence not ordered by the owner until he first has been notified, by phone or letter, preferably the latter, and ample time has elapsed for him to refuse to allow it. If possible have blanks on which your patron may write what repairs or overhauling he may desire, that there may be no cause for friction when settlement day comes. Many a patron is lost, and much dissatisfaction caused by neglect in this particular.

Keep posted on all the new things connected with your business. Know the strong and weak points of the new inventions that you may be in a position to intelligently advise your patrons regarding the new things they may think they want. Depending on your judgment, they will buy through you and thus add to your revenue. Even in the purchase of a new car or the sale of an old one you will come in for a share of profit which you will have justly earned by your careful conservation of the interests of your patron, and the beauty of it will be that he will grant it to you as a matter of course with no idea of permitting it to be otherwise.

Suggestions Worth Following

The spirit which will prompt a garage manager to follow the suggestions offered in this article will insure financial success for his place of business, whether it be his own or merely one of which he is in charge. He will make money, and he will have what few garages now possess, a clientele, each member of which is a boosting committee of one. Such a man will build up a permanently successful business institution, loafers will not congregate there, nor will they be tolerated, and when he changes location or vocation, it will be for something better.

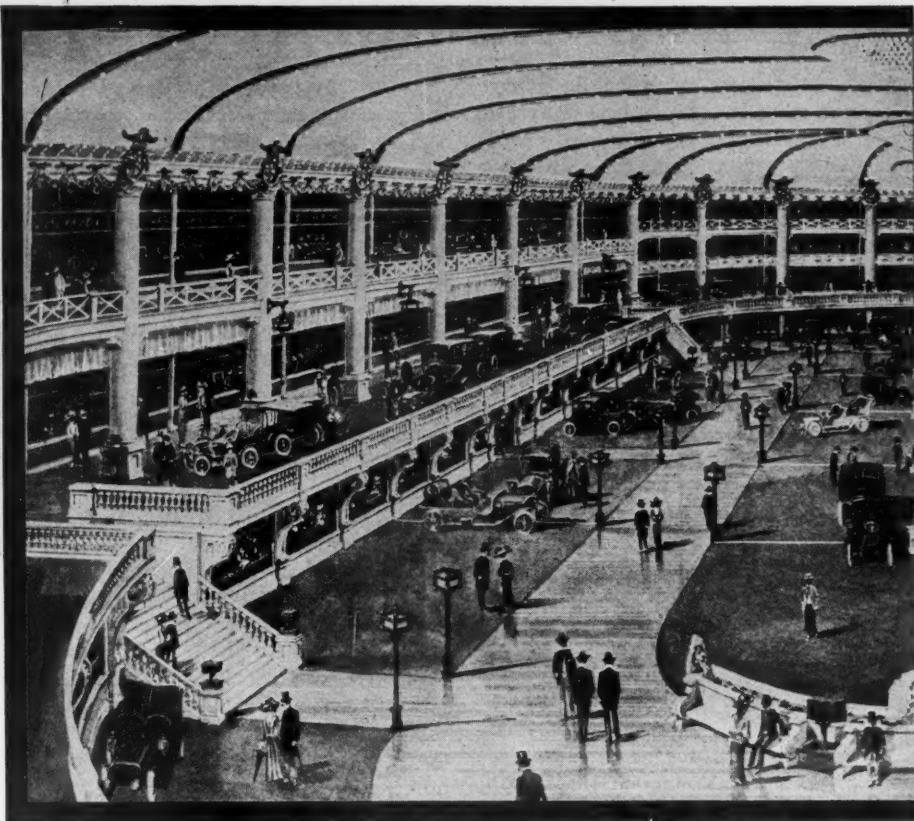


THE GARDEN POSTER GIRL

NEW YORK, Dec. 27—Of course Greater New York now is in the throes of the annual winter show season and with the big doings now going on in the Grand Central palace it might be supposed that all the motoring forces are massed in that building. Far from it, though. They're just as busy in Madison Square garden preparing for the tenth annual show which opens next Saturday night and for which a decorative scheme of unexampled gorgeousness has been worked out. More than \$30,000 is being expended for decoration for this show.

Roman Idea Carried Out

A Roman amphitheater of dignified architectural design will constitute the decorative theme and serve as a background for the exhibits. The garden interior this year will be richer and more magnificent than for any previous affair, although perhaps less profuse in treatment. The bare walls, steel girders and balconies of the structure will be lost to view and the whole interior so transformed that by only a small stretch of the imagination visitors may fancy they



GENERAL VIEW OF THE MAIN FLOOR AS ARRANGED FOR THE

Decorative Scheme of the Garden

have been carried back to the days when chariot drivers vied with each other on the concourse of the Circus Maximus.

In deciding upon the semblance to a Roman amphitheater the primary thought of W. W. Knowles, the architect who conceived the idea, and the show committee, consisting of Colonel George Pope, Charles Clifton and Merle L. Downs, was to get from the big, modern amphitheater a general impression of spaciousness, and no point was missed of which advantage might be taken. The layout of the exhibitor's spaces, of the galleries, elevated platform, railings and even the signs will lend themselves to this roomy effect. No plaster casts, bunting, rubber plants, palms or hanging bird cages will interrupt the general view. The idea of uniformity in the decorations will be carried out so completely that even the small spaces in the gallery will receive the same attention as those on the main floor. White and gold will be the dominant color in the scheme, although green and crimson, also, will be strongly in evidence. The girders of the big dome will be screened by a canopy of 7,000 yards of fluffy azure blue, amid which myriad incandescent lamps will twinkle. A score of huge arc lamps with colored shades will be pendant from the roof.

The exhibition spaces of the main floor and elevated platform will be carpeted with a specially-woven fabric of light green to lend something toward an effect of the cars being on the turf. More than 6,000 square yards of carpeting will be used. At brief intervals along both sides of the long aisles extending the length of the arena will be ornamental lamp posts, 8 feet high, finished in what is known as verd bronze. Lettering on these posts will inform the visitors of the names of the exhibitors adjoining and also direct them to the various departments of the show. Fifty of these lamps will be on the main floor and about thirty will illuminate the exhibits on the platform.

View From the Foyer

Entering the arena from the foyer, the visitor will be confronted by a Roman seat, extending about a fountain of pure design. The seat will be on the front of a low abutment of gray stone and integral with it except where at intervals bay trees will be set in gaps provided for them. The fountain will have a trough-like basin in which goldfish will disport themselves amid natural pond-lilies. Interspersed with the natural flowers will be artificial water plants and from the petals of these vari-colored lights will radiate. In the center and at each end water from the mouths of grotesque heads will spray upon a pool beneath made iridescent by cunningly concealed lights. Overlooking and extending along both





TENTH ANNUAL SHOW IN THE MADISON SQUARE GARDEN SHOW

Show Is a Roman Amphitheater

sides of the arena will be boxes which will seat more than 1,000 people. These boxes, at former shows, were covered so as to form a background for the cars exhibited on the main floor. It is expected that they will be one of the distinctive features of the coming show.

Other Decorations

Extending around all the outer edge of the elevated platform and towering upward to the dome thirty classic Doric columns will lend much to the stateliness of the effect. These columns will be actually 25 feet high and atop of each will be the emblem of the show—a wheel surmounted by an American eagle. Huge green-bronze lamps on brackets will swing from massive chains adown the column fronts. The columns will be white, while the emblems will be old gold in color and illuminated by tiny electric lights. Aside from their decorative value the use of these columns will add 7,000 square feet of exhibition space more than was available last year. The elevated platform which projects slightly over the main floor and also on the boxes will be supported by white Doric brackets. A white balustrade will extend all along the outer edge of the elevated platform, while the walls at the back will be coated with an imported cartridge paper of rich golden hue. On these walls the exhibitor's names will appear in white letters on a board background of crimson.

In the general view there will be three

balconies in the rear and in the front of the garden interior and but two on either side. The exhibits of the cars and accessories on the elevated platform will be separated by an aisle. Between the sky line and the vertical decorations, extending from column to column, will be hung richly colored garlands representing fruits and flowers. The upper balconies will be edged with a railing of Greek lattice work painted in white.

Latticed Arbor a Novelty

Nothing more novel ever has been introduced in decorations than the latticed arbor that will hood the exhibition hall with an arch of immense proportions. The woodwork of the arbor will be white and at the sides the walls will be finished with golden cartridge paper and thus the same color scheme of the main floor will be preserved. Overhead twenty-four white sunbursts will hang and an immense rosette will be suspended in the center of the hall. In the concert hall another strikingly novel feature will be presented. Here the exhibits will appear beneath a canvas tent ceiling similar to that of a circus tent. The same color scheme as that of the main floor will prevail here.

The basement is to be decked in a harmonious manner similar to the treatment in the other departments of the big show.



THE GARDEN POSTER GIRL

A rathskeller of the Dutch colonial type will be a feature. It will be painted in cream white and will be beautifully adorned with autumnal foliage which trails to the top and overhangs the two Doric columns at the entranceway. The interior of the rathskeller will be made to represent a genuine old tavern. A big fireplace surrounded with old logs, antique pots, etc., will be realistically worked out by the decorators.

RUSSIA WILL HAVE A SHOW

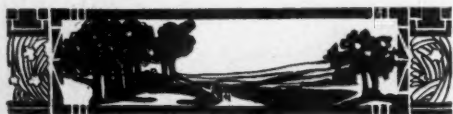
Moscow, Dec. 12—The Automobilst, which is Russia's only important trade paper, has been advised by the government of Russia that the show which has been promoted by the publishers will have the government's support. The show will be held February 15 to 28 and either the manufacturers or the agents in this country for these following cars have secured space: Darracq, Benz, Metallurgique, Austrian Daimler, Gaggenau, Saurer, Renault, Panhard, de Dion-Bouton, N. A. G., Adler. In connection with the show the promoters intend to hold a reliability trial between St. Petersburg and this city.



Dealers On The Coast Fighting Freight Increase

San Francisco, Cal., Dec. 22—The dealers of San Francisco and the entire Pacific coast have received a severe shock from the transcontinental railroads, which have served notice that freight on motor cars is to be advanced to figures which virtually mean an increase of 33 per cent. Such a storm of protest has been raised, however, that it is very doubtful whether the railroads will deem it wise to enforce their decision. The increase was ordered at a recent meeting of the Transcontinental Freight Association in Chicago over the protest of G. F. Detrick, manager of the Automobile Trade Association, of this city, who attended the meeting in the interests of some of the local dealers. According to Detrick, the transcontinental association advanced the carload rate on cars to California terminals from \$3 per 100 pounds to \$4 per 100 pounds, and reduced the minimum from 12,000 to 10,000 pounds, any length of car. For the northwest it made the same advance, but made the minimum 10,000 pounds on a 42-foot car and under and 12,000 pounds on all cars over 42 feet and up to 50 feet. Cars exceeding 50 feet will not be taken. It is claimed that the increase would cost the dealers of the Pacific coast \$250,000 a year. It is claimed that the dealers are at the present time paying the highest carload rate charged for any commodity, and, on top of this, the proposed increase has wrought the agents up to a high pitch. An organization has been formed to fight the matter to the end, either taking it before the courts or appealing to the interstate commerce commission for an equitable adjustment. The matter has been laid before the local traffic managers of the Southern Pacific and Santa Fe systems, and they have promised to give an answer in a short time.

It is claimed by those who have investigated the matter that the present charges are too high and unreasonable, and there is little doubt that the motor car men will not rest satisfied with the mere quashing of the move to increase their rates, but will go further and demand a reduction. The local men are being backed up in their fight by the dealers of the principal big cities of the Pacific coast. None of these is anxious to see the expense attached to the motor car business increased in any manner. The raise in the price of tires—always the bogey of the owner and the intending purchaser—has not been welcome, and on top of this the dealers do not wish to tack additional freight expense for the purchaser to pay. Such discouragers of business are not desired by the dealers on the coast.



INTERIOR OF THE AUDITORIUM IN COLUMBUS, O., ON THE FIRST NIGHT OF THE SHOW

Columbus Has First Show of Season

COLUMBUS, O., Dec. 27—When Governor Judson Harmon of Ohio turned the electric switch which illuminated the Columbus Auditorium, Christmas night at 8 o'clock, the first show ever held in Columbus was officially opened. The show is being held under the auspices of the Columbus Automobile Club, a large and flourishing organization.

When the doors were thrown open to the public, eighty-three cars were in place. A number of the cars had been delayed because of the congested traffic on railroads, due to the holiday season, and these cars will be placed in position later in the show. The cars are exhibited almost exclusively by dealers and agencies located in Columbus, the only exceptions being factories located in the Buckeye capital. In all, twenty-two different agents exhibit cars, and forty-three different makes are represented. Everything from the little Demotcar and Hupmobile to the seven-passenger touring car is shown.

The attendance the first night was all that could be hoped for. Thousands thronged the hall and much interest was taken in the display. It was society night and many rich costumes were worn by the 400 of Columbus. It is expected that fully 50,000 visitors will pass through the doors during the week of the show. As special rates have been given on all railroads in the area under the jurisdiction of the Central Passenger Association, many visitors from outside are expected.

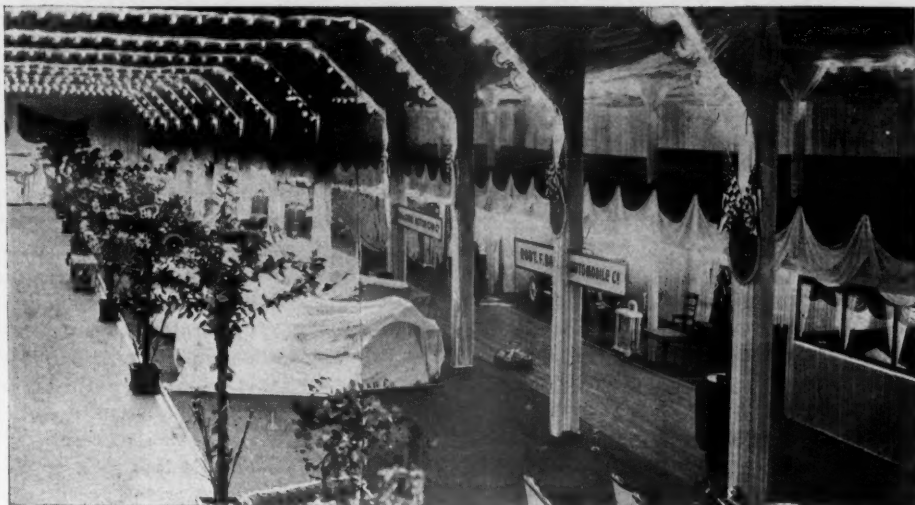
The ceremony of officially opening the show was dignified to the extreme. Before the governor mounted the band stand and turned the switch, the hall was only lighted by a half-dozen rows of electric lights. When the current was turned on, surprise and wonderment were expressed. Surprise and wonderment were expressed.

The interior of the hall is covered with white bunting, trimmed with red, and everything is in keeping with the holiday week. A huge motor wheel, fashioned out

of hundreds of various colored electric lights, was on the wall opposite the entrance. Scattered about the hall are many artificial palms and flowering plants which are decorated with many colored electric bulbs, giving the effect of natural flowers. Orchids and other foliage are much in evidence. The floor is covered with green burlap, which affords an excellent background for the cars. Before turning on the current, Governor Harmon made a few remarks in which he commended the club for the fine show and told of the wonderful strides which the industry had made in the past few years.

In case the show proves a success—and every indication points in that direction—it will be made an annual affair. The proceeds will be used for erecting a club house for the Columbus Automobile Club. The exhibitors are as follows:

O. T. Roberts & Co.—Stearns, Stoddard-Dayton, Overland, Lexington, Jackson.
Love Automobile Co.—White gasoline, Cole 30.
Maxwell-Briscoe Columbus Co.—Maxwell.
Broad-Oak Auto Co.—Pierce-Arrow, Chalmers-Detroit, Hudson.
Kimmel Brothers—Speedwell.
R. C. Wescott—Regal.
Ohio Motor Car Co.—Ohio.
Franklin Motor Car Co.—Franklin, Reo.
Central Ohio Motor Car Co.—Oldsmobile, Oakland.
Studebaker Automobile Co.—Studebaker, E-M-F 30, Flanders 20.
Early Motor Car Sales Co.—Rambler, Babcock electric.
Columbus Buggy Co.—Columbus electric, Firestone-Columbus.
McDonald Auto Co.—Buick.
Robert F. Boda Auto Co.—Mitchell, National.
Charles Schlear Motor Car Co.—Hupmobile, Velie.
American Auto Co.—American 40.
United States Carriage Co.—Rauch & Lang.
Apperson, Great Eagle.
F. E. Avery—Packard, Waverley electric.
Curtin-Williams Co.—Cadillac, Peerless, Winton.
Oscar Lear Automobile Co.—Frayer-Miller trucks.
W. A. Paterson—Paterson.
Franklin Cycle and Supply Co.—Demotcar.
Welton Auto Fender Co.—Fenders.
Williams & Schlereth—Tire inflators.
Barndt-Johnson Auto Supply Co.—Bodies and supplies.
Cleveland Puncture-proof Tire Co.—Tires.
Central Ohio Oil Co.—Oils.
A. C. Edwards—Motor cycles.
Columbus Auto Brass Co.—Lamps and parts.
Motor Supply Co.—Accessories.
Eckel Tire and Rubber Co.—Tires.



OF THE COLUMBUS AUTOMOBILE CLUB, WHICH WAS OPENED BY THE GOVERNOR OF OHIO

Trend In American Motor Design

(Continued from Page 21.)

stroke and at the beginning of the suction stroke. This motor has been further altered by reversing the position of the intake and exhaust valves so that now the carburetor is on the opposite side to the magneto.

The Falcar, a Chicago product, brought out for the first time last June, uses a motor made by the Excelsior Motor and Mfg. Co. This motor employs twin cylinders of the L type with circulating oiling system incorporated in the crankcase. The magneto is accessibly mounted on the left side and the carburetor on the opposite side, it being necessary to lead the intake pipe between the cylinder pairs. Placing the carburetor on the side opposite the magneto avoids any possibility of the explosive gases in and around the carburetor becoming ignited because of the short circuit on the magneto.

Hupmobile and Paterson

A couple of new motors, illustrated herewith, are the Hupmobile and Paterson, both of which are alike in that the motor and gearsets are unit castings, a construction which is becoming exceedingly popular. The Maxwell has long since been an able exponent of this construction, and the Moline has used it for several seasons. On the Maxwell and Hupmobile cars the flywheel is placed at the forward end, but on the Paterson it is inclosed in an extension of the crankcase. The Jackson motors are excellent examples of the unit construction and on all of them the flywheel is inclosed. It is an acknowledged fact that with the overhead camshaft particular caution must be taken to thoroughly lubricate the cams and rollers on the push rods and this has been done in the Jackson by entirely inclosing these so that they operate in oil. Inclosing them reduces to a great extent the noise which is more audible because of its being produced near the top of the bonnet where the metal acts as a sounding board, increasing it in not a few cases.

The Premier motor continues as an excellent example of the make-and-break spark, the design of 2 years ago being little improved upon up to the present. This motor also is conspicuous in that the intake manifold is of the simplest design for a four-cylinder motor with twin casting. This is due to the fact that the pipe from the carburetor leads to the space between the cylinders where it unites with a short transverse pipe which enters the ports of the cylinder casting between the second and third cylinders. This makes the pipe a short T.

In a cursory review of the motors, the fact cannot be overlooked that the circulating system of oiling is greatly on the increase, in fact it predominates in motors of all types and sizes and prices. The great value of this system of lubrication is the absence of external pipes so that the danger of these pipes breaking, or leaking, is entirely eliminated. The doing away of these numerous small pipes makes the motor parts more accessible and greatly enhances its appearance. But there is another great value, namely, the oil contained entirely within the crankcase is maintained at a uniform temperature and the danger of it congealing in cold weather, such as was the case with a mechanical oiler on the dash, is done away with. The majority of makers use the gear oil pump, a few, however, employing the plunger pump and driving it by an eccentric from the camshaft. It is pleasing to note the different makers who are putting oil floats at one side of the crankcase so that by merely lifting the side of the bonnet the driver can at once discover the exact level of oil in his reservoir. It is also to the credit of not a few manufacturers that they are fitting means whereby the oil can be readily drained from the oil reservoir as well as from the different compartments of the crankcase. Arrangements for filling the oil reservoir are more adequate than heretofore.

French Trade Aroused By the Marquis De Dion

Paris, Dec. 14—The leader in the recent issue of the de Dion-Bouton, the weekly published by the de Dion-Bouton concern, is a strong appeal to the small or younger manufacturing concerns of France to save the French industry, which, according to the writer—who is said to be Marquis de Dion himself—is in grave danger. Coming from such a prominent source the article is causing a stir in the trade, notwithstanding the lack of interest shown by the anti-road racing crowd. The veteran constructor has a strong influence with the trade and his opinion and advice is always carefully considered. In this article the success of the recent Olympia show is again called to the attention of the French trade and the writer declares that unless the French manufacturers do something, the car constructors from across the channel will rapidly become the leaders of the world's motor car trade. Shows as well as races are needed, are absolutely needed, is the opinion of the writer of the article. "Those concerns which think that one may rest upon past laurels are radically wrong," he says. "No matter if a concern manufactures or sells, it always will be going either ahead and progress or be stationary or go backwards. In order to keep going ahead it must do something. This is so true that the big concerns which decided not to have a show in Paris this year on the pretense that it cost too much and required making new models every year, nevertheless went over to London and exhibited new models. It is up to the young concerns to bring back to France our past supremacy. They must not be misled by the talk of the big concerns. The danger which confronts us is great. At the present time the patriotism of the French manufacturers must not only be moral, but also material. They must take into consideration their financial interests."

OLDFIELD SMASHES RECORD

Los Angeles, Cal., Dec. 26—Barney Oldfield and big Benz were the features of the 2-day race meet which was run at Ascott Park yesterday and today. Oldfield gathered several new records, chief of which was the 15-mile circular track mark of 13:57, made last summer by Ralph de Palma in the Fiat Cyclone. Oldfield went against this mark today and cut it to 13:42 1-5. He also defeated Kersher in the Darraq in a 5-mile race, doing the distance in 4:47. In yesterday's racing Oldfield put up a competitive 5-mile record of 4:35 by defeating Kersher in a match. Oldfield drove his usual mile exhibition and lowered the track record to :52 3-5.



EDITOR'S NOTE

This address on the motor situation in Europe was made by Charles Y. Knight at a luncheon tendered him on Tuesday of this week by the Chicago Motor Club, of which he has been a member since its organization. Mr. Knight is the inventor of the Silent Knight motor, which has created such a furore in Europe and which now is used by Daimler in England, Panhard in France, Mercedes in Germany, Minerva in Belgium and the Daimler in Italy. A former Chicagoan, Mr. Knight resides at the present time in Coventry, England, and has spent the last 2 years abroad, which has given him an excellent opportunity for observing the conditions that exist in Europe. Mr. Knight's speech was listened to attentively by seventy-five members of the motor club.

The European Motoring Situation

ties—the largest production amounts to 1,200 cars per year, and this is of what we would call a comparatively small type on this side. There are dozens of concerns in this country making a larger output than the largest in Germany. The German industry as a whole is noted more for the high class of its workmanship, quality of materials and general efficiency of the combination than for either number of cars produced or number of makers.

The condition in Italy is deplorable. It would seem that this country went motor-mad as the result of the success of one of the well-known Italian cars which through the splendid achievement of a number of its drivers in races won a world-wide reputation and for a while threatened the supremacy of France. This was a signal for dozens of concerns to spring up all over the country, to which the people rushed wildly to invest their money, and the puncturing of the boom by the last financial stringency has resulted in practical bankruptcy for almost every motor concern throughout the unfortunate kingdom. From the best information which I have at hand, I would say that very few if any of the Italian manufacturers are doing any great amount of business, and I might say that the interest, taken as a whole, could safely be classed as insolvent.

In Austria there are but few manufacturers, and those are small and have not been successful in producing a great many cars, nor have these cars been fortunate enough to win distinction through any particular feature or achievement.

The Belgians are marvelously ingenious and good mechanical people, and in this small but busy country several cars have won distinction in one way or another. There are but few manufacturers, yet those few appear to be resting upon a particularly solid foundation. Holland manufactures one or two makes; Switzerland has one or two, and there is a growing interest in Russia which promises well for the future of that country as a market, if not a manufacturing factor.

In the Northern Countries

The northern countries, such as Norway, Sweden and Denmark, practically have no motor interests, roads not being so suitable to its development, whereas the people of Spain, on account of the miserable roads and impoverished conditions of both, have done very little along this line. All that has been said of Spain may be applied to Portugal.

When we cross the channel coming this way, we encounter a condition different from any on the continent. While England as a country is not wealthy in min-

erals, with the exception of coal, nor productive in agriculture, except to some extent in live stock, it is a nation of shopkeepers and manufacturers and of marvelously wealthy people. The first ambition of the educated Englishman is to acquire a competence, and he is most careful and frugal from the beginning of his business career until he is ready to retire from active trade, which is at a much earlier age than the business men of any other nation in the world. He lays by a proportion of his earnings or profits against the day when he may rest on his oars and enjoy the fruits of his early endeavors. As careful as the Englishman is, however, to acquire a competency which he may enjoy in later life, he is afterwards wonderfully liberal in spending his money, up to a certain point. He differs with the continental in the respect that he will spend his money to within a narrow margin of his fixed income, and nearly always in proportion therewith; while it is characteristic of the Frenchman that it makes little difference what his resources, disbursements will not be greatly increased, though his income grows rapidly. He is wonderfully frugal and conservative. The Englishman is conservative, but may not be called frugal to the extent of his French brother.

Englishmen Not Penurious

England from early days has been a progressive nation in the matter of commerce. It may be said that it is a nation of merchants. For hundreds of years this people spread their energies all over the world and established able connections in the most productive regions of the various countries, where thousands upon thousands have investments bringing to England fixed and steady incomes. As a matter of fact, the English people might be compared



SITUATION IN FRANCE

"With one notable exception, I might say that were the largest establishments of France set down in America they would be called only moderate-sized concerns and, compared with the number of leading establishments on this side, would be considered small. I do not believe there is more than one concern in France, and I might say in England or Europe, whose annual output exceeds 2,000 cars, and even this concern's production is made up largely of taxicabs, the value of which does not count in the aggregate. In Germany, so far as I have been able to ascertain—and I have seen the statistics—the largest production amounts to 1,200 cars per year, and this is of what we would call a comparatively small type on this side."

THE status of the motor car business abroad today is considerably improved over that which has prevailed during the preceding 2 years, but conditions are by no means as favorable as they are in America, nor need it ever be expected that Europe will to any great extent parallel the United States in the production of motor cars. The natural resources of Europe have to a very great extent been exhausted through centuries of use by man. The proportion of people who have it within their power to purchase a motor car is very small. Despite the fact that the roads, as compared with those that exist upon this side, are practically perfect in almost every one of the first-class countries, motor cars are not met with to the extent one naturally would expect. As a matter of fact, it is surprising how few cars one will encounter in a drive through France, the roads of which are almost perfect and most plentiful.

France An Important Center

Taken as a whole, France, of course, may be classed as the center of the industry upon that side. There are probably a greater number of large manufacturing concerns in that country than in any other across the water. But these concerns do not in any measure compare, either in number or magnitude, with those in America. In fact, with one notable exception, I might say that were the largest establishments of France set down in America, they would be called only moderate-sized concerns, and, compared with a number of leading establishments on this side, even small. I do not believe there is more than one concern in France, and I might say, in England or Europe, whose annual output exceeds 2,000 cars, and even this concern's production is made up largely of taxicabs, the value of which does not count much in the aggregate.

In Germany, so far as I have been able to ascertain—and I have seen the statis-

As Seen By Charles Y. Knight

with an octopus, the body being England and the tentacles the various lines of commerce with which it reaches all over the world. It is said in England that when railroads pay dividends in America, English people will increase their purchases. The Englishman controls the gold fields of South Africa, which pour in to London millions of dollars of treasure every week; he is interested in rubber plantations all over the world, and in fact always ready to lend his resources to the development of any field of commerce which looks promising. England is naturally a nation of speculators. Almost every man, woman and child dabbles in stocks to a greater or less extent. The result is that they have both means and leisure for enjoying motor cars, and all Europe depends to a great extent on England as a dumping ground for its product.

Belgium, for instance, expects to market at least 50 per cent of its product of motors in England, while it is probable that nine-tenths of the thousands of motor cabs which ply the streets of the cities of Great Britain are produced in France. I presume that even a greater percentage than one-half of Germany's cars come to England for market, and Italy certainly looks to that country to absorb a great percentage of her output, there being no home demand of consequence for cars of Italian manufacture.

England's Old Law

It is because of the start which the continental manufacturers secured over the English industry as a result of the tomfool red flag law, which remained in force in the United Kingdom until the motor car became firmly established on the continent, that the English manufacturer was tardy in the field of development. When this 4-mile limit was repealed there were

no English manufacturers of consequence to fill the demand for cars, and the English buyer naturally turned to France and Germany, both of which, because of the unhampered home markets they had enjoyed for years, had created a capacity which served as a basis for filling the demand. It was not until the repeal of the fanatical red flag law that the English manufacturer had an opportunity for experience in the production of cars. His creation was looked upon, in comparison with the more finished product of the continental makers, in the same light as were the early efforts of our American manufacturers by our wealthy citizens and the high-class people of England looked upon the home-made cars with a feeling akin to contempt. This condition, coupled with the fact that England's exports were hampered by tariff barriers at the gates of all other countries, whereas the continent could ship cars to England without money and without price, so far as taxes were concerned, operated to hold the English manufacturer back. However, while it may possibly be said that the Englishman is slow to move, conservative to act and not strikingly original, he does have one characteristic which is valuable enough in the long run to more than make up for the shortcoming, and a trait which is responsible for England's commercial greatness, namely, his staid and persistent steadiness. His methods may be somewhat slow from our point of view, but they are safe and sure. He may not originate a new thing, but he will take it and improve upon it along safe and conservative lines. He will succeed in production where others would abandon an effort in failure. For instance, a few years ago American-made machine tools were almost universally used in the shops of England.

Improves American Tools

To-day the English manufacturer has not only improved the American tool, but gone the originator one better by adapting the design more properly to English requirements. So with the English motor car. In the early days it possibly was constructed to a great extent along the well known English practice of enormous weights and bulky strength. Latterly through slow but painstaking evolution weights have been reduced, the quality of material improved and the product generally refined. I believe to-day that the product of the leading manufacturers of England is of as high a character as that of the manufacturers of any other country in the world. The English are a people of high business morals and unquestioned integrity. Whatever they manufacture par-

MAKE MANY MODELS

"It is a noticeable feature of European business that few concerns are confined to one or two models. The Mercedes company of Germany will produce twelve different sizes and types of cars during the season of 1910; the Daimler company of England will turn out seven types; Panhard & Levassor, of France, will probably produce as many types as the Mercedes company, of Germany, and even a small Belgian firm, whose output does not exceed 500 cars, will make at least three models. The result of this great number of models is to increase the cost of production to a great extent. Taking down and setting up tools for so many parts necessitates having a great multiplicity of patterns, etc., and the necessity of accumulating a great variety of supplies handicaps production."

takes largely of these sterling qualities. Cars are not produced for mere selling purposes without regard to what may become of them after they leave the works. In fact I think the very limited area of the country has something to do with the care with which our English cousins put the machines together, because one can start from any corner of the land at daylight and reach the farthest portion by sunset on a summer's day, and the British owner has a very annoying habit when his car is not up to concert pitch of jumping into it and driving to the factory, there to confront the powers that be, as there are no such things as bad roads to protect the shop engineers from unpleasant calls from any point. I picture some owner of an American car in California driving it across the continent to Buffalo to see about a defect in the rear springs or the intermittent action of a trembler coil! I have a large boudoir-sized photograph of this!

Manufacturers of England, however, are a most conservative lot and it may be said that while business has improved to a remarkable extent during the past 2 years, there are few if any new concerns springing up. As a matter of fact, last year four of the leading institutions had very narrow escapes from bankruptcy because of their great proportions when compared with their available market. Three of these have not as yet recovered from their perilous financial condition and I doubt if they ever will. It may be said that there are only two establishments in England which may be called fairly large. The Daimler company at Coventry is by far the most important of all English concerns and is at present employing 3,200 men about 15 hours a day, the working time for the machine shop being 6 o'clock in the morning until 9:15 in the evening. The production for the coming year, however, will not exceed 2,000 cars.

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ENGLAND IS IMPROVING

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LABOR CONDITIONS ABROAD DISCUSSED

"I am asked to compare labor conditions and capacity of workmen of Europe and America. This, I fear, is rather beyond the field of practicability for the reason that conditions under which production is carried forward in these sections differ radically. They differ also in various parts of European countries from those which prevail in England. In England the greatest efforts have been employed to keep labor matters in such shape that the country can compete in the open market with any country in the world."



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On the continent, however, European governments have imposed most onerous conditions upon employers. In France no working man may be employed overtime without a special permit from the national commissioner of labor. This permit is not granted except for a specified time and is not always obtainable. Such conditions prevent the possibility of French manufacturers rushing through parts and finished products and to my mind is the greatest possible detriment to the motor car industry.

Rigid Laws in Belgium

While the laws of Belgium are not so rigid or unreasonable regarding overtime work, the worker has taken it upon himself to refuse to so work, and the employer who dares employ a man on Sunday is liable to arrest and imprisonment. It further came under my observation only about

3 months ago that a strike was called in a leading Belgian motor car factory because some of the workmen did not belong to the socialistic party, their fellow workmen demanding their dismissal because they were not of the same political stripe.

Continental Workmen Careful

Things move slowly as a rule with the continental manufacturers. They are most careful in the design, construction and materials which they put out to the public, and as every other industry is similarly handicapped with regard to labor conditions, getting work through is a slow and tedious undertaking and the leading French makers never pretend to put upon the market a product which has not been under test at least a year and a half. The continental workman moves exceedingly slow, very carefully, and generally measures his work and checks it two or three times before finally proceeding. He does not seem to realize the necessity for rushing. In France no one is ever in any particular hurry, and if there is no hurry in France, he argues, why should there be any place else in the world? As a rule, however, when the French workman is finished with a job it is a product to be admired. He spends a tremendous amount of time in studying the problem before he goes into it and it is seldom a fizzle.

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COMPARISON OF CARS

"I am asked to compare foreign cars in detail with those produced in this country. This is likewise a most difficult proposition for the reason that conditions under which the cars are used in Europe are entirely different from those under which American cars are used. I have stated that, so far as I can observe, our best American cars are as good as the best cars produced in any other country in the world. Yet it would be difficult to say how American cars, operated under the same conditions, would stand up on the continent if they were tried out there."

cars are used. I have stated that so far as I can observe our best American cars are as good as the best cars produced in any other country in the world. Yet it would be difficult to say how American cars operated under the same conditions would stand up compared with those produced upon the continent. Americans repeatedly draw attention to the miserable roads upon this side as evidence that superior general design and construction are necessary to withstand the stresses thereby produced. It is possible that this may be the case with regard to certain elements of the cars, such as axles and springs, but motor cars on the continent and in a large portion of Europe are used in a manner never contemplated by the American manufacturer. In France in particular the most perfect design and construction is required to withstand the tremendous speeds which are attained upon the long stretches of straight roads encountered in nearly every section of that country. The motor which in America might be used for years, with no suggestion of difficulty, is liable to be broken to pieces within a limit of 25 miles in France. The French driver especially is a most reckless and daredevil sort of a fellow. He opens his throttle regardless of conditions and does not consider for a moment that the motor is entitled to the slightest bit of consideration. The lubricating mechanism and other features of the car are supposed to be foolproof and at the tremendous speeds attained the usual warnings which a neglected or overworked mechanism sends forth are entirely drowned out through the rush of air and vibration of the car. A French smash is usually a bad smash.

Do Not Realize Conditions

The failure of American and English manufacturers in the racing game in France is very largely due to the lack of comprehension of these conditions. As a matter of fact, I believe that France is the only country in the world where a motor car can be tested out to a point which will insure its operating successfully within the borders of that country. Even England, which has 157,000 miles of improved roads, has very few stretches where more than 5 miles straightaway can be had for testing the motor at full speed. No test upon the bench or brake can be depended upon to reveal weaknesses which might be brought out upon these roads at top speed. Very few manufacturers of fair-sized motors pretend to test them above 1,200 revolutions per minute. Then when this motor goes on the road in the chassis and the operator opens up his throttle to 60 miles an hour or more for a long stretch, as great as he can find, the motor may be delivering its full power at 1,700 or 1,800 revolutions per minute, and a lubricating mechanism which is arranged to supply the cylinders at an average speed of 1,200 is inadequate at 1,700 on account of the great heat generated in the cylinder, which increases much more

rapidly in proportion than the speed of the motor. It is my opinion, based upon general observation, that because of the strenuous work that the foreign cars are called upon to do, the average efficiency of the continental motors, so far as the production of power is concerned, is in advance of the motors of this country, the difference lying very largely in carburetion and dimensions of gas passages.

Quietness of Operation

It is my observation that while the American manufacturers of motors so time the opening and closing of their valves as to produce the quietest effect in operation the continental maker with few exceptions does the reverse, and designs his motor for power and speed. You may take it that with the poppet valve motor quiet running is invariably obtained at the expense of efficiency, because the strength of the valve springs and character of openings required for the greatest developments of power carry with them the necessity for noisy valves and tappets.

In some sections of Europe there is considerable difference between the policy of the sales department as compared with America. The general margin of the agent's profit in England is 10 per cent. Under some special conditions he may receive more and again less. Those American dealers who think they are much imposed upon by so-called joy riders stand aghast to see an English agent lending a prospective customer a car for a week or so for trial; yet this is not at all uncommon. On account of the perfect conditions of the roads, it is possible to go many miles for the purpose of calling upon a prospective customer and salesman frequently drive 50 and 60 and as high as 150 miles to meet some prominent man who contemplates the purchase of a car.

As a rule in England the salesmen are of a very high class and of superior intelligence. The Daimler company has inaugurated a policy of maintaining its own depots throughout the country. It equips garages, repair shops and salesrooms throughout with all facilities for taking care of spare parts, and puts the place in charge of men of very high business ability and integrity as well as social standing. It maintains five of these depots throughout England, and each depot is a center for its business in that district. This does not necessarily mean that all of the cars in each section are sold by the depot manager. On the other hand, if a manager should see fit to do so he may appoint an agent in his territory and allow him commission for selling. In fact, one of the concerns which sold the greatest number of Daimler cars during 1909 was an independent London agent maintaining a salesroom within a few blocks of the Daimler central store.

While the selling rule of the manufacturer is 33 per cent of the amount of the purchase paid down at the time of con-

WIRE WHEELS POPULAR IN ENGLAND

"Indications of two radical mechanical departures are plainly apparent upon the English motor-car horizon and cannot be safely ignored by the remainder of the motor world, because they undoubtedly are in the right direction and tend toward economy and efficiency. The first has been in evidence for several seasons, but the latter has attracted little attention until during the last few months. Quickly detachable wire wheels have undoubtedly come to stay. Few English concerns will go on the market without them."



summing the order, in the case of customers and those well known sales are frequently made without the passing of any money whatever.

I was very much amused one day while in the office of the sales manager of one large concern to be shown a letter from a titled customer enclosing a check for £100 and ordering a car, stating that he would like the balance of the amount to be carried over until next fall as he would be very busy hunting the coming 2 or 3 months, and his hunting expenses would absorb all his income at the time. In England this attracted no particular attention, but I told Mr. Sales Manager I had no doubt the reply of an American manufacturer would be that he did not care to trust anyone who spent such a large amount of time and money hunting. As a matter of fact, a large percentage of the class of people who maintain cars have practically all their own time to do what they like, and no man is looked upon with suspicion there because he is not at his desk from 9 o'clock in the morning until 5 at night.

Blunders of the French

It is my firm conviction that the French manufacturers have made two very great blunders within the past 2 years. First was their decision to abandon the Paris salon, and the second the dropping of the grand prix. Great pressure was brought upon the Society of Motor Manufacturers of England to induce it to abandon the Olympia show. This, however, it refused to do, and the unlooked for and unprecedented success of the Olympia just

closed has fully justified its attitude. The fact of it being the only show of consequence on the other side this year resulted in the huge success of that one show, and the foreign buyer who in former years visited the continent but once a year, at the advent of the Paris show, this time visited Olympia, giving the English manufacturers a chance to do business with him. The great success of the Olympia show is encouraging for the motor business of the entire world, as it demonstrates the fact that even in those countries where motoring has been indulged in by the people the greatest length of time, there is no evidence of waning interest, the fact being that such interest is steadily and rapidly growing.

The great features of the recent Olympia show was the general rush of trade toward small-sized cars. However, this does not necessarily mean small price. It is the general desire of the continental and English motorists to reduce the cost of upkeep of his car to the minimum. With the tremendous advance in the price of rubber, the advent of a 6 cents per gallon tax upon gasoline and a yearly revenue tax amounting to \$50 on a 40-horsepower car and \$200 on a 60-horsepower, makes motoring much more expensive than ever before. Yet I must say that the general opinion at the close of the show was that very many more larger cars than anticipated were disposed of, and the pendulum having been rushed precipitantly to one side through sheer weight of numbers seems to be swinging back in the other direction to some extent.

Use of Wire Wheels

Indications of two most radical mechanical departures are plainly apparent upon the English motor car horizon and cannot be safely ignored by the remainder of the motor world, because they are undoubtedly in the right direction and tend toward economy and efficiency. The first has been in evidence for several seasons, but the latter has attracted little attention until during the past few months. Quickly detachable wire wheels have undoubtedly come to stay. While they were apparent only upon two or three makes of 2 years ago, few English concerns for 1910 will go into the market with a car without provisions for supplying this important improvement. In 1908 the Daimler company put out probably six cars with



WORM-DRIVE COMING IN

"The second undoubted evolution, which was unmistakably heralded at the recent Olympia show, is the substitution of the worm-drive for the bevel propulsion for small cars. This practice has for many years had two successful adherents in England, and for 1910 there will be no fewer than a half-dozen recruits. The cause of the evolution is the general tendency to produce enclosed cars for town use with large bodies and small motors. This means a further increase in the ratio between the pinion and crown gear in the rear axle and correspondingly difficulty of production."

Owen Thomas In New Car Deal

removable wire wheels. Last year almost 75 per cent was thus equipped, while for 1910 at least nine out of ten Daimler cars will carry the removable wire wheel, and every wheel upon every chassis will be quickly detachable, though the spokes may be of wood. It is the general experience of those who employ the wire wheels that they add life as well as speed and smoothness to the car, while the tire bills are unmistakably reduced. Personally I would not care as a permanent thing to drive a car with wooden wheels after my 2 years' of contact and year of experience with the detachable wire wheel. The former now appear most clumsy and of useless weight to me.

While this equipment has not yet found much favor on the continent because of the fact that it originated in England, the fact that foreign makers who supply cars to English buyers are compelled to meet their wishes in this connection is an entering wedge which is rapidly introducing the wire wheel into Europe, not, however, without considerable resistance upon the part of the continental manufacturers who 2 years ago barred the employment of the removable wire wheel from the grand prix and at the same time eliminated the most promising British competitor. Americans object to the wheel upon the ground of washing difficulties, but practical experience has proven that this is more fancied than real.

Worm Drive Is Popular

The second undoubted evolution which was unmistakably heralded at the recent Olympia show is the substitutions of the worm drive for the bevel propulsion for small cars. This practice has for many years had two successful adherents in England and for 1910 there will be no fewer than a half-dozen recruits. The cause of the evolution is the general tendency to produce enclosed cars for town use with large bodies and small motors. This means a further increase in the ratio between the pinion and crown gear in the rear axle, and corresponding difficulty of production. It is well known to engineers that when the ratio between the driver and the driven bevel goes lower than 3 to 1 the problem of producing quiet gears increases to a maddening extent. And if I were asked today what is the outstanding obstacle to the production of the car as demanded by the purchaser who yearly becomes more discriminating I would answer the production of quiet gears.

The worm gear always is quiet and lends itself particularly to low ratios. It has been until very recently considered less efficient than the bevel. But investigation and experience have demonstrated that this deficiency is more in workmanship than design. Properly constructed the worm gives results quite indistinguishable from the bevel. So far, however, such perfection has only been attained by worms produced on one particular machine which so cuts the tooth that the greatest

MILWAUKEE, WIS., Dec. 28—The Corliss Motor Co., of Corliss, Wis., incorporated for \$1,000,000, to build motor cars, of which \$250,000 has been paid in, will use the big plant of the Wisconsin Engine Co., of Corliss, until its own plant is completed. Construction work has been started. The new concern, which is owned by the leading stockholders of the engine company, has bought the Owen Thomas Motor Co., of Janesville, and the new plant will adjoin the engine works, where the company has bought 10 acres. The product will be an all-steel six-cylinder car, invented and designed by Owen Thomas, of Chicago, who established the Owen Thomas Motor Car Co. at Janesville, Wis., last year. Insufficient backing at Janesville led to the sale of the patents and rights of manufacture to the Corliss manufacturers in September of this year. The car has been known as the O.-T. Six and was exhibited at the Chicago show last February. Practically no wood will enter into its construction, the body, frame and all parts being of steel, supplied by the eastern steel mills owned by the men back of the Wisconsin Engine Co. The car has not yet been re-named. W. P. Bloodgood, of Milwaukee, is president; George B. Foster, late of the Bullock Electric Co., is secretary-treasurer and in charge of the business end. The directors are Pittsburg, Racine and Milwaukee people.

possible bearing surface is obtained, and thus the tendency of the oil to squeeze out at low speeds because of the abnormally high pressure is avoided. Tests upon Brooklands between worm and bevel-driven 15-horsepower Daimler cars leave no room for choice, and the silent and smooth effect in the tonneau of an enclosed car is as pleasing to the customer as the ease of manufacture and adjustment of the worm gear is to the maker. I know that several American makers are testing the worm for small town cars.

The Six-Cylinder Proposition

The six-cylinder proposition is no longer a problem upon the other side. There seems to be a general admission that up to a certain horsepower the four-cylinder answers every requirement, and that above those sizes the six is desirable. The problems of construction naturally increase with multiplicity of cylinders, not, however, upon the basis of numbers or in proportion thereto, as these problems are of an entirely different character and concern the designer almost wholly. A six-cylinder motor built upon the basis of the simple addition of two or more cylinders to the four, having no regard for increased dimension of certain parts or attention to carburetion, spells six-cylinder failure, and this almost every designer has had to learn through most expensive and nerve-racking experience.

A temporary office has been opened in the Robinson building at Racine.

Conflicting reports emanate from Racine, Wis., as to the future location of the Racine Mfg. Co., manufacturer of tops, dashes, etc., whose plant was destroyed on December 12 with a loss of \$600,000 and \$199,000 insurance. The company has received many flattering offers, and officials are visiting Sandusky, O., Indianapolis, Waterloo, Ia., and other cities which have extended inducements.

BLOW FOR MILWAUKEE SHOW

Milwaukee, Wis., Dec. 27—Fourteen well-known Milwaukee agencies have announced their intention to stay out of the show to be given by the Milwaukee Automobile Club in the new Auditorium, from February 22 to 27, inclusive. They represent twenty-five leading makes of cars. The reason is that they do not believe the expense of exhibiting is justified by the profits to be derived. The agencies and their lines are: Mitchell Automobile Co., Mitchell; Rambler Garage Co., of Milwaukee; Rambler; Sanger Automobile Co., Maxwell, Stearns, Oldsmobile; Curtis Automobile Co., Reo; Jonas Automobile Co., Peerless, Cadillac; Welch Brothers Motor Car Co., Packard, Rauch & Lang electric; Akin Motor Car Co., Stevens-Duryea, Columbia electric; Emil Estberg, Pope-Hartford, Waverley and Woods electric; Hickman-Lauson-Diener Co., Ford; White Brothers, Moline; Riverview Automobile Co., Moon; Bates-Odenbrett Auto Co., Overland, Winton, Marion; Albert O. Smith, Palmer & Singer; American Automobile Co., Pierce-Arrow, Apperson and Babcock electric. Private shows will be conducted by each agency in its own garage.

WANT SIDEWALK REMOVED

Boston, Mass., Dec. 27—Boston motorists have just presented a rather unique petition to Mayor Hibbard. It asks that the entire sidewalk that extends along Boston common from Park to Charles streets, a distance of more than ¼ mile, be removed in order that motorists may have more room, or, rather, that have vehicles may have a wider street. At first the petition seemed absurd, but figures were gathered showing that very few people use the sidewalk, as they prefer to walk along the mall of the common. So the petition is a logical one, and it should not meet with very great opposition. At night many owners of cars walk to the corner of Beacon and Park streets to get into their machines, as it is too congested down town. And it is the same in the morning, so Beacon street is a much traveled thoroughfare. During the day many drivers use Beacon street instead of Tremont. By doing away with the sidewalk it would give about 8 feet additional space all along Beacon street.

Peace Now Exists In Kansas City

KANSAS CITY, MO., Dec. 26—The beligerency of the two factions of motor dealers in Kansas City lost some of its strength during the good will of Christmas week. H. E. Rooklidge, president of the Motor Car Trade Association and former head of the old organization, the Kansas City Automobile Dealers' Association, produced the peace pipe and took the first puff at it. George A. Bond, president of the Kansas City Automobile Dealers' Association, was the second smoker, and there is now the happy prospect of harmony again after the two shows are over. A city show is to be given by the Motor Car Trade Association the week of January 17 with twenty-five gasoline cars, eight electrics and eight commercial trucks as features. Many novelties in decoration are promised, but are withheld for the present. A number of new cars will be seen in the fourth annual of the Kansas City Automobile Dealers' Association in Convention hall the week of February 28.

Christmas week developments along Kansas City's motor row were: S. Simon succeeds to the motor top building concern of the late C. D. Quier, 300 East Seventeenth street. The Anhut six has been placed with the Auburn Motor Car Co., agent for the Auburn and De Tamble. Henry C. Merrill is now direct factory representative of the Moon Car Co. as well as agent in Kansas City.

A three-speed planetary transmission with reverse is the distinctive feature of the Salter car, manufacture of which was quietly begun in Kansas City a couple of weeks ago. A small frame plant was put up at Centropolis, within the eastern limits of Kansas City, and about ten men, machinists and smiths, are turning out parts of the transmission and rear axle of the car. This is all that will be built at the plant until next spring, when it is hoped to make necessary enlargements. The body is being built in Kansas City and engines are to come from the east. The transmission is the invention of William A. Salter, who holds a patent on it. J. M. Watson is superintendent of the small plant.

OHIO'S OFFICIAL REPORT

Columbus, O., Dec. 27—Interesting statistics are contained in the annual report of the state registrar of motor cars of Ohio, which was completed recently. The report covers the calendar year and shows that 23,000 cars were registered in the Buckeye State during the year which is coming to a close. Of the 23,000 cars which registered 809 are steam cars, 2,157 electrics and the remainder gasoline cars. As the state law was well enforced in every portion of the state, it is safe to presume that the number of cars registered represents the motor car strength in the state as far as owners are concerned. Owners living in other states and registering

cars for use within the limits of Ohio number sixty-six. Of that number Kentucky has the largest number because of the cars owned by residents of Covington and Newport, across the river from Cincinnati. The report shows that Cuyahoga county, which contains the city of Cleveland, has the largest number of cars licensed, 5,301 in all. Hamilton county, containing Cincinnati, is second with 1,539 cars. This is due to the hilly and stony condition of the roads in that part of the state, as with better roads many more cars would be operated in Hamilton county. Franklin county, containing Columbus, is third with 1,357 cars registered, and Lucas county, containing Toledo, is fourth with 1,088 cars. Montgomery county, containing Dayton, is fifth with 1,047 cars registered, and Summit county, containing Akron, is sixth with 787 cars. Stark county, containing Canton, is seventh with 625 cars, and Mahoning county, containing Youngstown, is eighth with 447 cars.

WEMME CUP TO BE RENEWED

Portland, Ore., Dec. 25—Arrangements for the holding of the Wemme cup races at Portland, June 11, have been completed between the Portland Automobile Club and the A. A. A., according to announcement made during the past week by Secretary Will Lipman, of the Portland Automobile Club. June 11 is Saturday, the last day of the annual rose festival week, and the same date selected by the club for the race meeting last year. Now that they are assured of the date for the big event the directors of the club expect to go ahead arranging for the details of the race meeting. The roads on which the races are to be held will again be put in shape and much money will be spent in this way. Arrangements have been practically completed for the taking out of four of the turn in the course and thus making it a four-turn course.

PASSING OF FAMOUS GRADE

San Francisco, Cal., Dec. 22—The famous—or perhaps it should be called the infamous—San Juan grade is soon to be a thing of the past, so far as the motorist is concerned. Every motorist who has toured in California knows the San Juan grade, for it blocks the road between San Francisco and beautiful Del Monte, one of the world's famous resorts visited by mostly every tourist of note and the winter home of many. The board of supervisors of Monterey county has let a contract for the construction of a road from Salinas to San Juan, at the northern base of the mountain, which will obviate the necessity of climbing the big hill. The new highway will run through San Miguel canyon and will cost about \$10,000. The building of the new road is largely the result of the work of the Monterey County

Automobile Club, which has made persistent efforts for a better means of communication between the north and the beautiful Monterey country. The San Juan road affords the only direct route down the coast and to Del Monte, and consequently it has been a bete noir to many a motorist. A few years ago, before cars reached their later state of efficiency, the grade was almost insurmountable, but since the advent of the high-powered and hard-pulling cars of today the ascent has not been one of great difficulty, but the extremely rough character of the road, where boulders protrude from the ground on one side, and on the other there are deep ruts, make it very hard on machines, and the abrupt turns are always a source of danger. From the town of San Juan to the summit of the grade is a distance of 3½ miles, while the descent on the southern side is about one mile. Its passing has been hailed with joy by the touring motorists.

BUFFALO CLUB ELECTION

Buffalo, N. Y., Dec. 24—More than 600 members attended the recent annual meeting and election of officers of the Buffalo Automobile Club. The following officers were elected: President, Laurens Enos; vice-president, Harry Thorp Vars; treasurer, Donald Mackay; secretary, Dai H. Lewis; directors, Charles Clifton, Edwin R. Thomas, George C. Diehl, George P. Urban, John G. H. Marvin, Maurice M. Wall and Edward H. Butler. A silver loving cup was to have been presented at the meeting to the retiring president. The cup was there, but President Satterfield was not. He is confined to his home by a serious illness. His annual report was read. He laid special emphasis on the success of last year's show in Buffalo; on the club's monthly magazine, which now has a circulation of more than 2,500; on the activity of the club in safeguarding the public from irresponsible motorists and on the completion of the new road map of western New York. Secretary Dai H. Lewis' annual report shows that the club has a total membership of 1,806. The number added in the past year was 632. According to a resolution adopted the club wants brick paving from Buffalo to Williamsville, 20 feet wide instead of 16 feet. Interesting reports were next read by George K. Birge, of the Niagara Boulevard Association, and H. A. Meldrum, of the committee on laws and ordinances.

MORE KISSEL ENTERPRISE

Hartford, Wis., Dec. 28—In line with the policy of the Kissel Motor Car Co., of this city, to provide comforts and home facilities out of the ordinary, a boarding house has been established for the employes, near the plant. The company has built up a harmonious and energetic organization by carrying out this policy and in this way has enjoyed the cream of skilled labor which has aided in the production of cars.



The Readers' Clearing House



MAY BE LEAKY MANIFOLD

WAUKESHA, Wis.—Editor Motor Age—Through the Readers' Clearing House will Motor Age tell me what is the matter with my 1910 Cadillac touring car? It has run 2,500 miles. When running slowly the engine misses and causes considerable jerking. When running fast it goes smoothly. The car is fitted with a magneto and Delco system of ignition. When I open the petcocks on cylinders 3 and 4, I can see an even flame come out without a miss; on closing 3 and 4 and opening cylinders 1 and 2 the flame is uneven and misses considerably. When I open the needle valve for more gasoline and then open cylinders 1 and 2, they explode all right, while cylinders 3 and 4 sputter and miss, as do cylinders 1 and 2, with less gasoline. The carbureter was the Cadillac's own make, but I substituted a Schebler, but there was no improvement. The car has been running unevenly for some time.—Ed Christoph.

Apparently your intake manifold has a leak or a leaky joint where it is connected to cylinders 1 and 2. The fact that you have tried a different make of carbureter and had the same effect would still further indicate this. This leak will permit fresh air to get into the mixture and dilute it for cylinders 1 and 2. As you say when you have a good mixture for the first and second cylinder, you have too rich a mixture for the third and fourth one, and when you have a good mixture for the third and fourth it is too weak for the one and two. If this is tightened up your motor should run all right.

WHEEL ALIGNMENT NECESSARY

Jackson, Mich.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House, kindly answer the following: 1—Should the front wheels of a motor car toe in? I have been informed they should—that it is common practice among builders to so set them, as it tends to easy steering and eliminates wobbling of the wheels when passing over uneven surfaces. The writer contends that toeing in or out is a waste of power, injurious to tires and incorrect. 2—Could the tread of a heavy drop-center front axle be increased $2\frac{1}{4}$ inches—measuring center to center, top and bottom of the wheels—and have the drop, distance between spring seats and appearance of axle remain unchanged? It is claimed by some that an axle found to track $58\frac{1}{4}$ inches was so lengthened. The writer claims an error in treads was made, either when the car was drafted or assembled.—A. B. Cowan.

The wheels of a motor car should be in alignment one with the other and parallel with the wheels on the opposite side. If

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

they are not so the result will be a wear of tires. It is quite possible that a front axle could have been spread between the spring seat to increase the tread of the wheels and that the play in the spring shackle bolts would allow the springs to be bent over, say $\frac{7}{8}$ -inch on each side. Motor Age takes it that this axle was of a standard tread, which is usually $56\frac{1}{2}$ inches, and to spread it to $58\frac{1}{4}$ calls for $\frac{7}{8}$ -inch on each side. If the rear wheels are of the same tread as the front, then it undoubtedly was designed for that tread.

NOISE MADE BY AIR

Petersburg, Va.—Editor Motor Age—In operating my Regal 30 I notice a noise which sounds as if there is a considerable amount of air passing through some part of the machine. I have been told that this is air passing through the carbureter and, in fact, I have been told there is too much air passing through it. Now, I am perfectly ignorant concerning this point and will appreciate if Motor Age will enlighten me on the subject. Bear in mind that the entire machine is working perfectly so far as I can discern, and I would like to know if this noise is made, as stated above, and if so will it be apt to do damage in any way to the mechanism of the car?—J. B. Andrews.

The air necessarily rushes through the carbureter at very high velocity and in doing so there would be the sound of the air passing through. If, as you say, your engine seems to run perfectly, indicating that your mixture is right, this sound, unless it is objectionable from a noise standpoint, would not do any damage to your engine. It is quite possible that this might be eliminated by adjusting at the compensating air adjustment.

CRITICIZES RUBBER STORY

Bridgeport, Conn.—Editor Motor Age—I have taken exception to some statements that have appeared in Motor Age October 28 entitled "Age the Greatest Foe of Rubber." This rubber story appears funny to me in not a few respects and I have taken the liberty to add the following brief remarks regarding several aspects of it.

In regard to sulphur bloom: Sulphur bloom is yellow, not gray. The gray color of the tire is made by the use of soapstone which is rubbed into the tire while it is hot from the mould.

A superintendent who turned out goods that bloomed as a regular thing would

soon be out of a job. A tire when it leaves the mould is not green, it is very nearly black. Chloride of sulphur is not used to cure tires, it is used in what is called the cold cure for thin goods. Bisulphide of carbon is used to cut chloride of sulphur and reduce the strength of same in the dip cure for thin goods. It is also one of the best solvents known for rubber. Sulphur does not change the color of the rubber in the heat; if so, it would not be possible to make red, white or any color but black. Sulphur is used to cure any and every kind of rubber, no matter what the color.

Crude rubber cannot be picked apart with the fingers. Para rubber is about as tough a thing as you will find. You can cut a chunk from a ham of Para and if you were not in the rubber trade you could not tell if it was cured or uncured. Rubber has both life and elasticity in its crude form, but heat will soften it and cold harden it; after it is cured heat and cold have no effect on it.

After sulphur is added to rubber it never leaves it. When you find a piece of rubber that is dead, it is dead from the sulphur, not for lack of it. The absence of sulphur does not permit the fabric to shuffle, it is caused by the use of a cheap stock, poor work, or overloading the tire.

Rubber in its crude state will stand for years without harm. After it is cured it starts to go bad, so instead of sulphur being the life of rubber it is the death of it. A stock made of nothing but crude sulphur will go bad a good deal quicker than a compound of fair grade. Friction heat, if long, will act on the sulphur and make it a curing agent the same as it would in the mould, but it does not destroy the sulphur.—J. A. Wilson.

DEFINITIONS OF MIXTURES

Dewey, Ill.—Editor Motor Age—Will Motor Age tell me what is meant by a rich mixture, a poor mixture, and what is the right kind of mixture? By what force is the mixture drawn into the combination chamber, and how is the speed of a gasoline engine regulated? How does the float in a carbureter act, and what is meant by flooding the carbureter? If the float were to leak what would happen, and what should be done while touring if the float leaks, and how can the float be repaired? How can one prevent the water in the radiator from freezing? Can an exhaust valve be automatic? What is meant by cycle?—Alwin Jones.

In speaking about the mixture for gas engines, one refers to the gas used in the cylinder. This gas is composed of a certain percentage of gasoline vapor and air, approximately fifteen of air and one of gasoline vapor. The weak mixture is one

in which there is not sufficient gasoline vapor; a rich mixture is one in which there is a superabundance of gasoline vapor in proportion to air. The gas is drawn into the cylinder by the downward or outward stroke of the piston on the same principle that a pump operates. The speed of a gasoline engine is controlled by the amount of gas allowed to enter to the cylinder. The float in the carbureter is to maintain the liquid at a constant level in the spraying nozzle. Flooding a carbureter is done by pressing the float and opening the float valve, allowing gasoline to overflow at the spraying nozzle. If a float should leak the gasoline running into it would make it heavier, and thereby raise the level in the float chamber, causing your level to be too high. If your float leaks while on a tour you may first locate the leak and then solder it up, if you have appliances for so doing. If not, a little laundry soap smeared over the leak may give it temporary relief. About 1 gallon of alcohol to every 2½ or 3 gallons of water put into your tank should keep the water from freezing at about zero, and should the water freeze the ice will be that rotten kind of ice which will do no harm to the radiator or waterjacket. In speaking of the cycle of a gas engine, one refers to the operation that takes place inside the cylinder, those operations being intake, compression, explosion and exhaust.

CARE OF TIRES IN WINTER

Camp Point, Ill.—Editor Motor Age—I have two new outer casings and inner tubes which I will not use this winter. Will Motor Age advise me of the best way to take care of same during the time they are not in use?—H. B. Henry.

The best way to take care of your tires will be to keep them in a dark, cool, dry place. It is well to wrap the casings in burlap or even heavy paper.

NON-FREEZING COMPOUND

Bedford, Ia.—Editor Motor Age—What proportion of denatured alcohol should I use with water to prevent the mixture from freezing?—C. A. Bishop.

If you use 1 gallon of alcohol to every 2½ or 3 gallons of water used in your cooling, this should keep the water in the radiator and waterjackets from freezing.

COMPLETING SECONDARY CURRENT

Lincoln, Nebr.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House, give me a little information on the following: (1) In the regular spark coil used on motor cars, the primary and secondary wiring having no metallic contact, through what medium does the high-tension secondary current complete its circuit from the motor to the coil? (2) In the regular non-vibrating coil is there a continuous spark at the plug as long as a contact is maintained at the distributor or timer, or does the spark occur only when the contact is broken at the distributor or timer?—An Interested Reader.

The secondary current completes its circuit to the coil through the commutator wire unless there is a special ground wire for the purpose. Some coils are equipped with this secondary ground. In a non-vibrating coil unless there are vibrations at the commutator contact there is only one spark and this spark occurs when the contact is broken at the timer.

RUNNING ON COAL OIL

Neosho, Mo.—Editor Motor Age—Through the Readers' Clearing House will Motor Age kindly answer the following questions: (1) What changes are necessary for adding coal-oil feed to a gasoline engine? (2) Is it necessary or of any advantage to feed water through an air pipe when running on coal oil? (3) Would it be of any advantage to heat the oil before going to the needle or feed valve? The engine is a 40-horsepower with vertical valves, the valve chamber bolted to the cylinder head, and then governors on the fuel supply. When running the charge passes over the exhaust valve, which becomes red hot, frequently igniting the charge too soon, causing it to back-fire through the air pipe.—G. M. Hainsworth.

An internal combustion motor should run on coal oil or kerosene once you get the motor warm. A number of instances that Motor Age knows of motor cars with two tanks—one for gasoline and one for coal oil, both leading to the same float chamber in the carbureter. The motor is started from the gasoline tank and as soon as it is running the gasoline float is shut off and coal oil furnishes the fuel without any change of adjustment. It would be impossible, though, to start the motor on kerosene unless it is warm.

READ THE ADVERTISEMENTS

Hannibal, Mo.—Editor Motor Age—I have a four-cylinder Winton fitted with a clutch transmission. I desire to change this to a three-speed sliding gear. Can Motor Age inform me where I can secure such? Also I would like to know where I can obtain a three-speed sliding-gear transmission that will fit on a 1909 model 10 Buick. Where can I secure springs for motor cars made to order?—C. L. Mueller.

Motor Age knows of no sliding gear transmission on the market that could be placed in either one of these cars without considerable trouble and alteration. It is possible, though, to buy transmission and springs from parts dealers, and you are referred to the advertising columns of Motor Age for their names and addresses.

THE PORCELAIN COLORS

Nashville, Tenn.—Editor Motor Age—I have a two-cylinder 12-horsepower car with the engine under the seat. Will Motor Age tell me, through the Readers' Clearing House, what causes the porcelain spark plug on the front cylinder to blacken from carbon while the back cylinder never grows darker than a light brown, even after a 100-mile run?—Nashville.

The blackening of the porcelain on the front cylinder is due to too much oil being fed. Reduce the amount of oil fed to this cylinder and the trouble to a large extent will be corrected.

NO TIMER IS NECESSARY

Spring Valley, Ill.—Editor Motor Age—Through the Readers' Clearing House will Motor Age inform me of the simplest way to put on a battery starter on a four-cylinder four-cycle motor which has only a Bosch high-tension magneto. The magneto is of the set-spark type with no advance on it. Can I in any way run the current through the magneto to set off the charge in the cylinder without going to the trouble of putting on a timer?—J. L. M.

If your magneto is of the D or D-R type, which you may learn from the letters stamped on the base plate of your magneto, send it to the Bosch company at Chicago, and it will make the necessary changes upon it, to convert your ignition system from a single to dual; and provide you with a special coil and switch starting device, which will enable you to start on the spark under favorable conditions, and make cranking easier when necessary.

SALESMAN CORRECTS MILEAGE

Milwaukee, Wis.—Editor Motor Age—I wish to acknowledge the error in mileage computation in my article, November 11 issue, and would assure the readers of Motor Age that same was not done intentionally nor with a view of making my car appear to show up a lower mileage record than the facts warranted. It was simply a case of misfiguring on my part and I am indebted to White Streak and H. L. Hughes for calling my attention to it in their respective articles. Without in any way wishing to reflect upon the above named contributors for their well-meant corrections, I wish to say this, however: That, if the sole result of my year's careful accounting has only been to call forth discussions on possible errors in figuring, its aim has far miscarried and I shall be sadly disappointed. The real intent of my story was to invite responses and comparisons from other owners of second-hand cars relating to their maintenance expense. I am still a novice in this line, having but a year's motoring experience to my credit, and would much appreciate expressions from fellow motorists as to whether my published account for that type of car, considering the strenuous use it has been put, would be considered high or low, or just average. I find there is a general tendency among users of second-hand cars to be rather reticent about their expense account or at best when approached upon the subject give but little information. We get plenty of information out of manufacturers' catalogs as to how economically this or that can be operated, when it is new of course, but let us hear more from people who have run their cars for a number of seasons or have one that has seen

service before it came into their possession. If some of my brother motorists had been less reticent about their operating expenses when I called upon them for advice I probably would never have bought a second-hand car, as I have since found out by costly experience that in the long run it is cheaper to buy a new car. However, I still believe and shall continue to do so until otherwise proven by facts and figures that the one-cylinder type of motor car is the best and most economical car for general, all-the-year-round, knock-about purpose that I have yet found. In fact, notwithstanding the seemingly high-expense average, so well pleased am I with the consistent performance of my little car that were I to get another it would be a one-cylinder, but it would be a new one I can assure you.—City Salesman.

COGS IN A PLANETARY

Los Angeles, Calif.—Editor Motor Age—Through the Readers' Clearing House will Motor Age give me the following information: 1—In the ordinary two-speed planetary transmission are there any cog-gear wheels whatever? 2—Will Motor Age give me the names of all machines having offset crankshafts? 3—What are compression plates? 4—Are all makers of licensed cars A. L. A. M. members?—A. S.

In the ordinary two-speed planetary transmission there are about eleven gears and great care must be taken to lubricate them. Motor Age is at present unable to give you the names of all the manufacturers who offset their crankshafts, but the average number is about 6 per cent, among which are Winton, Rambler, Stevens-Duryea, Cadillac and Mitchell. Compression plates are plates which are bolted or riveted onto the piston head for the purpose of reducing the compression space and thereby increasing the compression. At present makers of licensed cars are A. L. A. M. members, but it is quite possible that in the future licenses will be granted for permitting non-member manufacturers to build cars without joining the association.

WEAK COMPRESSION MYSTERY

Port Gibson, Miss.—Editor Motor Age—Through the Readers' Clearing House will Motor Age kindly answer the following: I have a four-cylinder motor with automatic intake valves, and one cylinder does not seem to give any power, although exploding regularly; also the compression is very little, although I can find no leak; the intake valve does not depress as much as those of the other cylinders. What is the trouble? Are the exhaust valves not working properly? I have been troubled a great deal with the motor having spells of missing, and with the throttle wide open only a very slow engine speed, possibly only one explosion out of ten is as it ought to be. The gasoline in the carbureter is full of air bubbles, as if it were boiling. What is the trouble? Is the G-L economizer of any real worth? If it increases power and

decreases fuel consumption, as claimed, why is it not used on all racing cars?—L. B. A.

If you have poor compression in any of the cylinders it may be due to a leak by the piston ring through any of the joints or the valves. By squirting some lubricating oil around each piston, which you can do through the spark-plug holes, it would tell you whether your pistons were leaking. If you still fail to get compression, squirt some oil around all joints leading from the cylinders and then when cranking watch these joints for bubbles coming up through the oil. If it doesn't leak here then grind in your valves with a little fine flour of emery mixed with lard oil into a paste. Make sure that there is a play of the thickness of a visiting card between the bottom of the valve stem and the valve tappet. By doing this your engine should regain its compression. You might notice whether or not the valves opened and closed at the right time, and watch the location of the piston when the exhaust valve closes. This piston should be just starting downward on the intake stroke. The intake valve should open at about the same time the exhaust valve closes. If your carbureter has a water chamber around it it may be that the water makes the carbureter too hot and increases the specific gravity of the gasoline too much. It wouldn't, however, cause it to boil. In a racing car speed and not economy is the consideration. The drivers do not care how high the fuel consumption is.

SCHEME NOT FEASIBLE

Minneapolis, Minn.—Editor Motor Age—I have a patron wishing to reduce the speed of his car—a model F Buick—by interposing a jackshaft between the engine and rear axle sprockets. His plan is to go from the engine to a sprocket mounted on a shaft with a pinion. This pinion meshes with a second one, and that with a third, the three pinions being necessary to prevent a reversal of the power. On the third pinion shaft a second sprocket is mounted, which goes to the rear shaft. Can Motor Age advise me what would be the loss of power in making a reduction in this manner? I send herewith a sketch of the plan.—Charles Wilber.

Your system for increasing the gear ratio on this model F would not be feasible. There would be a tremendous loss of power, as well as making it very noisy. Why cannot this reduction be done in the usual manner by increasing the size of the rear sprocket or reducing the size of the sprocket on the transmission?

MERITS OF OFFSET CRANKSHAFT

Earlville, Ill.—Editor Motor Age—I have had an argument about the damage done to a motor car to start it on the spark. Will Motor Age give its views on the subject from the standpoint of a five-bearing crankshaft and offset, such as used in the Rambler, Cadillac, etc., versus the three-bearing crankshaft and the regu-

lar style offset as set on most cars? Also how would it affect an engine with five bearings and the regular style of set?—D. B. S.

It undoubtedly is hard on the bearings and crankshaft of an engine to start on the spark, but it is such a common practice and so little damage seems to result from it that it might not be necessary to discontinue the practice on that account? A five-bearing crankshaft can be made lighter to obtain the same amount of rigidity than a three-bearing crankshaft could be. A number of gas-engine designers offset their crankshafts slightly, the amount of the offset differing with the different designers, one concern putting the offset at 25 per cent of the cylinder bore.

GAS AND STEAM SPEEDS

Hot Springs, Ark.—Editor Motor Age—Will Motor Age kindly settle the following argument? Will a steam motor car maintain its top speed as well as a gasoline car, both being capable of a speed of 100 miles per hour? Which would be the more apt to arrive at a given point first—say 100 miles distant, both cars working perfectly? Why are so many more gasoline cars used than steam cars?—Robert G. Davis.

In answer to your first question if both cars are capable of that 100-mile-an-hour speed, they should both arrive at a given place at the same time. It may be a little harder to maintain a high rate of speed on the steam car unless the generator has a capacity for making sufficient steam. The most probable reason for the preponderance of gasoline cars over steam cars is that there probably are 300 makers with their advertising and selling forces booming gasoline cars all the time as against about half a dozen makers of steam cars.

PIERCE-ARROW TIRE ECONOMY

Minneapolis, Minn.—Editor Motor Age—I think we have a better tire record than those published in the last issue of Motor Age, as the cars mentioned are all light-weight machines. We have a six-cylinder, seven-passenger Pierce-Arrow, weight 4,351 pounds, and it has gone 4,783 miles on Goodrich Q. D. tires without a puncture and the tires are in good shape up to the present time.—Subscriber.

LYTLE'S WHEREABOUTS

La Crosse, Wis.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House, inform me whether or not Herbert Lytle is driving a car now, and if so, what car? Where is he at present?—W. R. Montague.

Herbert Lytle has not driven a racing car since his accident at Riverhead, L. I., last fall, but he has by no means retired from racing. At present he is at Kokomo, Ind., where he is employed in the testing department at the Apperson factory. Lytle drove an Apperson in the 1909 contests, until the accident above mentioned.



Manufacturers' Communications



LONG VS. SHORT-STROKE MOTORS

NEW BRITAIN, Conn.—Editor Motor Age—The standardization of the modern motor car is so clearly established that one is apt to lose sight of the fact that there are still certain details of design and construction over which engineers differ widely. These do not result, however, in the bitter controversies which were formerly waged over such questions as shaft versus chain-drive, water versus air-cooling, selective versus progressive type of transmission and sliding gears versus planetary transmission. One question which is now beginning to engage the attention of motorists is that of the short-stroke motor versus the long-stroke motor. The advocates of the short-stroke motor claim many advantages for their type. To me it seems that gasoline motors are not like steam, relying on the slow expansion of gas, but are impulse motors, where the pressure is very high for a short time and after that can be practically neglected; therefore the piston travelling an equal distance in the same time revolves the crank further on a short-stroke motor, thereby giving more power. The short-stroke motor has shorter connecting rods, lower cylinders, smaller crankcase and lighter flywheel, all of which saves weight. The lower cylinders give a lower center of gravity, another important feature. The vibration is less with a short-stroke motor because each impulse is applied with a smaller lever arm. For the same reason the strain on the transmission, universal joints and level gears is less like a hammer blow. Other advantages of the short-stroke motor are that it cranks easier, is more economical of gasoline because of its smaller piston displacement, accelerates quicker and is capable of higher speed.—Guy Hutchinson, Corbin Motor Vehicle Corporation.

WHITE REPORTS ON OLYMPIA

Cleveland, O.—Editor Motor Age—On my visit to the English show I discovered that more cars were shown in Olympia than ever have before been brought together in a single exhibition. To be specific, in last month's London show there were 597 complete cars and chassis, against 575 at the 1908 Paris show and 381 at the last Chicago show. The car of moderate size, moderate power and moderate price was supreme. It is hardly an exaggeration to say that the leading car

of every exhibitor was of that type. As regards details of construction there was, of course, the widest possible divergence just as there is at any show, owing to the fact that different makers stand pat at different points along the path of progress. But as soon as the visitor to Olympia limited his study only to the cars of world-wide reputation which from year to year practically set the pace in design, the resemblance was so startling as to demonstrate that the leading designers, in their striving for the ideal car, have all been led by the logic of the situation toward a certain standard. The en bloc engine construction—casting of the four cylinders in one piece—has been adopted by every foreign maker who has brought out a newly-designed car in the last 2 years, and the same applies to the long-stroke engine, as the advantage of these features have been thoroughly demonstrated. With the adoption of the en bloc engine there is a well-defined tendency to simplify the engine by reducing the amount of piping, wiring and other outside appurtenances. Those makers who have made the most progress along these lines have eliminated all external manifolds and have included the intake and exhaust passages within the engine casting. By this construction they have gained the further important advantage of heating the intake gases and water-cooling the exhaust gases, thus making a great stride forward in economy of fuel, besides increasing the amount of power obtainable from a cylinder of a given size. As regards ignition, the majority of the leading makers depend entirely upon the magneto. Another feature which has become practically standard construction is that of a four-speed transmission in the high-grade car of moderate power. The English industry is recovering from the depression of a year or so ago and has settled down to a stable basis. I visited a number of the English factories and found that most of the well-established makers were prospering, but there has been a great weeding out of the concerns which were launched during the boom times without adequate resources to do business and to look after their customers except in boom times.—Walter C. White, White Co.

IN PONTIAC, NOT STREATOR

Pontiac, Ill.—Editor Motor Age—In a recent issue of Motor Age was a mention of our firm under the item from Streator, Ill. Since that time our mail has been going to Streator instead of here. This was an error and should have read Pontiac. The Pontiac Motor Car Co. is located at Pontiac, Ill.—Pontiac Motor Car Co.

LEFT-HAND CONTROL

New York—Editor Motor Age—The reasons for the popularity of the left-hand drive, which has been adopted by the Reo, at once became obvious when the questions of comfort, safety, economy, convenience and efficiency were carefully considered. Take the instance where the statutes or local ordinances require all vehicles to be so placed and headed in public thoroughfares that the right side of the car is next to the curbing. It will readily be seen that with the levers on the left side the occupants of the front seat may step directly upon the sidewalk. This is of positive advantage to both the driver and owner. Not so with the right-hand drive. With it the passengers must take the alternative of either climbing over the levers, extra shoes and other accoutrements out upon the sidewalk or alight at the left side of the car out on the road, frequently in mud and slush, and then through all this scramble for the sidewalk via the rear or front of the car. No further proof is necessary to show the practical and positive advantages of the new over the old.

A word as to safety, comfort and efficiency. With the left drive the operator's left hand is free to shift the levers and blow the horn. This permits of the exclusive use of the right hand for the steering wheel. The opposite of this prevails under the old method. There the driver must almost invariably make a quick change in handling the steering wheel from his right hand to the left in order to be able to shift the levers. Result: two movements to do what is now done by one with the left drive. After once experiencing the happy contrast in favor of the left-hand drive very few drivers, if, indeed, any at all, would drop the new for the old. Further, on narrow roads, the driver with the left-hand drive is able to gauge more safely the clearance when passing other vehicles. This is especially true where the roads are narrow, sharply-crowned and poorly-ditched. Another case of comfort plus safety equalling preference and popularity for the left-hand drive. Then it is claimed by eminent engineers that the running of the vertical motor placed in front tends to depress the right side of the car which is largely overcome by placing the driver on the left side.—R. M. Owen.



In Commercial Realm

CARL L. MORGAN, for 10 years identified with the commercial truck business in New England, while in Boston a few days ago prepared a paper relative to the commercial field and its future that is somewhat out of the line generally seen in print, for it was more in the way of a lot of good advice to men who are thinking of changing from horses to motor vehicles. It is fair, sensible and very convincing. He says:

"While it is the general impression that power trucks are a coming utility the tendency is to let the other fellow try them. This is due to the belief that they are more or less of an experiment and also to the natural hesitancy of the business man to adopt methods unfamiliar because not immediately under his daily observation. The successful manufacturer of today, to keep pace with the times, adopts every labor-saving device and every new machine that will decrease the cost of production. Why should not highway transportation receive the same care and thought as any other item in total cost?"

"Ten years of successful, and perforce profitable operation is the record of power trucks in several of our large cities. The unsuccessful attempts have been due to treating the machines as experiments; to working them beyond capacity; without proper or even common sense supervision and with an idea that the impossible was not too much to ask.

"That both gasoline and electric motor cars of the pleasure type are an economic necessity, is forcibly attested by the millions that are paid out weekly in wages to the men working in this industry. The number of these machines in constant use, not as mere pleasure cars, but as business-producing agents, as labor-saving machines, surely runs into the tens of thousands and in all parts of the United States. Why is it then that in but one city—New York—the commercial vehicle or power truck is being bought as are other mechanical devices. Why is it that in all other sections of the country the approach of the salesman is a sign for hostility? Why, unless the subject has had nothing except superficial attention and an unwarranted scepticism.

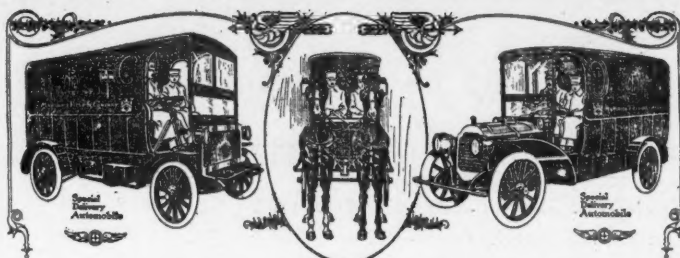
"Here is a machine, essentially a labor-saving device, a machine capable under favorable conditions of doing more than three times the work per day that can be done by horses; a machine more reliable, more dependable and one that by its labor saving will frequently show from 30 to 50 per cent return on the investment; one that today has reached a point of excellence, standardization and practical efficiency unquestioned by those familiar with mechanical design and construction. Not that every so-called power truck is capable, but there are many motor ve-

hicles produced in quantity today by reputable manufacturers which have been proven and are no longer theories.

"The individual is confronted by his own peculiar condition and his own service. His usual process in purchasing—as soon as his desire to see "how a motor truck will work" becomes sufficiently compelling—is to write to manufacturers for catalogs. Then come interviews with salesmen, offers of free demonstrations, free service, and even money-back propositions, until finally in nine cases out of ten the result is the purchase of a machine from the concern which offers what seems to be the safest proposition to the merchant.

"Investigation shows that power vehicles earn dividends; that they show remarkable results in economy, and the wise man, appreciating that the change from horse to motor service is no mere demonstration, but involves new methods and ideas, treats this reorganization in an engineering way, based on actual service and on the proper selection as well as application of the power trucks. His first step is the investigation of present costs, present and future service and the real although sometimes hardly apparent actual requirements of the business. He makes a careful tabulation trip by trip of his different teams and drivers, checks these figures against what he would like to do, and then arranges his power truck service, not along the lines of the horse-drawn wagon, but as limited by the actual demands of his customers, his railroad or express shipments, and with no particular thought nor attention to past methods, but just in regard to what one man can do per day.

"The next step is the selection of the capacity of the vehicle for each separate class of service; the number of light delivery wagons and of heavier trucks, and finally, the investigation of the machines themselves. He is then ready to consider either the entire or partial replacement of his horses. His ideas are crystallized and he can confine himself to the analysis of the power vehicles as machines.



EVERY DAY FROM NOW UNTIL CHRISTMAS

**Quick Delivery Service
to All Parts of the City**

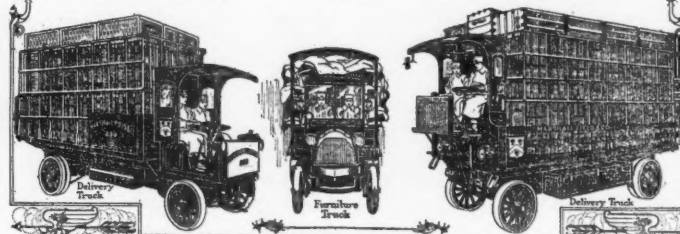
Is Assured to Gift Purchasers by

MARSHALL FIELD & COMPANY

Every detail of equipment and organization has been considered with a view to rapid and efficient service. Our deliveries are now up to the minute. Our shipping-rooms are awaiting today's purchases. Great Motor Trucks are in readiness to make trips at frequent intervals to our numerous stations in or adjacent to the residential districts. Wagons will cover their respective districts from these stations many times daily.

Friday, the day before Christmas, will see this service entirely adequate for every demand—promptness is especially assured in deliveries to all districts, and after the closing hour—six o'clock—deliveries of all purchases, whether small parcels or pieces of furniture, will be immediately made over all routes covering the entire city. Every possible safeguard has been taken against the possibility of any delays or errors.

This perfected delivery system is but part of this store's plans to make this store in every way attractive to those whose time for gift buying will from now on be necessarily limited.



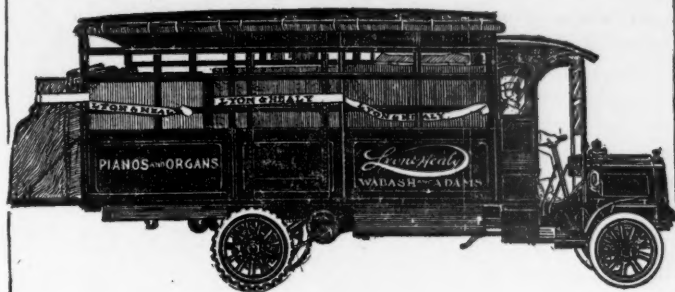
MARSHALL FIELD & CO. BOAST OF THEIR FLEET OF MOTOR CARS

"Both gas and electric machines have their individual field with little or no encroachment, the one on the other. The electric is the most reliable, the most economical and by all odds, the most satisfactory power vehicle, wherever it can be properly used—generally for parcel delivery within a distributing radius of 10 miles, approximately, or where 30 miles may be taken as a maximum per charge. It is clean, free from dirt or odor, and always presents a thoroughly attractive appearance; and when supplied with an extra battery, will generally furnish all of the mileage that one driver can handle day in and day out. Close students realize the remarkable advantages, and it is those only superficially interested or directly antagonistic who decry this machine and enlarge on what may appear to be shortcomings. One property not generally considered but unique with the electric, is the inability of the driver to race the machine, while the speeding possible with a gasoline car has put in the junk heap more power vehicles than any one misapplication; for as a driver doubles the speed above the safe and economical rate, he practically quadruples both upkeep and operation.

"In considering a schedule, the prospective purchaser should be fair and accurate in estimating the speed of horse-drawn wagons. Take actual times on some of the routes and don't guess that a two-horse

Motor Mail Collections

World's Largest Piano Truck



A Lyon & Healy Motor Which Carries Seven Pianos

Pianos Bought Now Can Be Delivered Christmas Eve

Lowest prices on Steinway Pianos, Lyon & Healy Pianos, Pianola-Pianos, Washburn Pianos and ten other makes. Prices range from \$100 to \$2,000. Two years' time granted when desired, or any reasonable terms to suit individual case.

Open
Evenings
Until
Christmas

Lyon & Healy

WABASH AVENUE AND ADAMS STREET

SPECIAL!
Cash payments
may be
deferred until
after Christ-
mas—piano
delivered now

BIG MUSIC HOUSE PROUD OF MOTOR TRUCK

team with a 3-ton load will make 3 or 4 miles an hour, nor that a parcel delivery wagon will do 10 or 12; and always keep in mind that the primary object of the power truck is to get more work out of each man, both by increased speed and greater loads.

"The gasoline machine has unlimited mileage, being independent of its base of power supply and is also able to speed up where road conditions and conservative driving permit. It however suffers from the petty troubles and adjustment that every gas engine-driven machine must inherit, and therefore requires a fairly well educated operator, although there is little or no need to hire a professional chauffeur for the purpose.

"The user of the electric knows that his machine in its elements is standardized, that it has lived through years of strenuous application and he can figure by the records which have been made almost to a dollar what his operating expenses, year in and year out, will be. With the majority of gasoline machines, it is a question whether they are standardized and while this might be taken as an argument against the purchase of such, the main object is to reduce present costs, and as it needs only 2 or 3 years of operation at the most to pay off the investment, there is no question but there are many gas machines capable of returning satisfactory dividends, if the service calls for this

manufacturers, to those who have competent sales-engineers, and ask them to criticize the schedule, methods, and to make further suggestions; then and then only consider the type and kind of machine needed.

"Even if teaming is done by contract, there are good chances to save money by scrutinizing, not only the service being given, but the facilities placed at the disposal of the contractor and above all do not overlook the handicaps which may be unconsciously placed on him. For example—a man contracting for a large amount of teaming carelessly said: 'We couldn't afford to do our own teaming, there are too many delays. Why, there's a team right outside that's been waiting 2 hours.' Inquiry developed that this particular contract was the chief source of profit to the teamster, and that in the previous 3 years he had made money enough to double his equipment in business. Who paid for that wait?"

NASHVILLE GETTING AMBITIOUS

The board of public works of Nashville, Tenn., is considering the advisability of buying a motor fire engine. New fire equipment probably will be purchased during the coming year and the chief of the department has recommended a motor. The city engineering department also has applied for a touring car for use in connection with street and sewer work, and it also has been suggested that the police have one motor patrol wagon.

particular type of a motor-power truck.

"Before starting a general purchasing investigation, it is best to go directly to present service and analyze its every detail. Figure solely by the limitation of the man, throwing aside all consideration along the lines restricted by the horse. Make up a new schedule where each man must produce his maximum and each truck be operated the greatest number of hours per day. Put on additional helpers if the time of loading or unloading is abnormal, consider in shipping or receiving departments new methods actually to reduce the time spent in handling goods, sorting or loading. Then go to the truck man-

AN exhaustive test recently has been made in Kansas City, Kan., in the collection of mail from 150 street letter boxes scattered over a 31-mile route. By the ordinary method of collection, this takes two men and two horses 7 hours and 20 minutes to collect. By the use of a White steamer one collector went over the route in a little more than one-third the time. A similar service has been installed in Newton, Mass., a suburb of Boston, and which has astonished the postoffice department at Washington both through its financial economy and through the improvement in the service. In this service on the noonday collection a White steamer carrying a chauffeur and one collector start at 9:30, and arrive at their starting point again at 12:30, after having covered 35 miles. On this collection the program is a collection of six boxes on the way to Newton Lower Falls and any Waban mail addressed to the place is left at that post-office. Before 10 o'clock the carrier is at Auburndale, in season to forward by train all mail that may be addressed to Boston or beyond. From the boxes he visited last the collector probably has taken mail addressed to postoffices at which he already has collected. He cannot double on his tracks in order to leave it, but he arranges to connect with a circuit train which practically retraces his route.

An evening collection, which takes up fewer boxes, covers a route of 22 miles in about 2½ hours. Midnight collection follows when the car running out from Boston makes a wide sweep of 65 miles, gathers the contents of some 200 letter boxes and returns to the city to unload shortly before 3 o'clock.

On the morning collection one man does the work that otherwise would call for six men. On the evening and midnight collections one man takes the place of five. To one unaccustomed to the work it would seem almost impossible for the one man to collect the boxes and sort the mail, keeping up with all the time schedules.

IT IS DIFFERENT NOW

One cannot help but notice the change in the attitude of Chicago business houses towards the motor trucks and delivery wagons. A couple of years back few concerns used them, and there were scoffers aplenty. Now it is different, which was demonstrated during the holidays, when some of the houses made capital out of the fact that they are using motor delivery system. Probably the loudest praise is given by Marshall Field & Co., who devoted considerable space in the newspapers to advertising the superiority of their motor system. Lyon & Healy, who have just purchased a Packard, capable of carrying seven pianos at a time, also advertised this fact in the daily newspapers.

LACK OF GET-AT-ABLENESS OF MOTOR CARS

EACH year about this time, when the descriptions of new models are appearing in the various class journals, the writer has always found it quite interesting to study the feature of accessibility. When first joining the motor car ranks it seemed to him that the following year would find the different designers taking advantage of the get-at-ableness shown on their neighbors' products, and that within perhaps 3 or 4 more years all designs would be practically standard, the location of the various elements being such as the experience of the majority had shown to be most accessible. This assumption was far from correct, however, and, although there has been a strong tendency in that direction, it is really surprising to see how important parts are still put in such inaccessible places about the car.

Starting at the front of the car and going back, the following points are some that may be noticed: On at least two cars of 1910 model, the starting crank is so close behind the cross-steering connection that if one is not careful to keep his hand away from the extreme end of the handle, he is liable to draw blood at the first swing of his hand. In one case there is so little clearance that it is impossible to crank the motor unless the front wheels are in the exact central position, otherwise the crank strikes the cross connection.

Hot Radiator Caps

How many radiator caps are provided with any means for rendering them get-at-able when too hot to hold the hand on, and still how easy some have made it by hinging the cap and arranging a simple spring so that the cap may be snapped either open or shut.

How simple a matter to place a petcock for draining the water from the cooling system, yet in some 1910 cars it is necessary to remove the rubber hose from the connection near the bottom of the radiator.

How easy it is to place the fan stud in a slot or on a swinging arm, but one finds cars with no means for tightening the belt without cutting off a section of it.

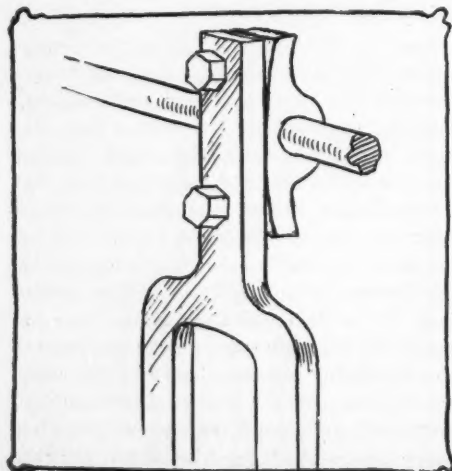


FIG. 1

Many fans which run on cup-and-cone bearings have the adjusting nut in front of the fan, where it is inaccessible. It often is just as cheap and practical to place it behind the fan, where it is more accessible.

How many fans can be removed without at least loosening the radiator?

Location of the Timer

Lift the hood and look for the timer. Sometimes it is placed at either end of the camshaft, where you cannot see in without the aid of a mirror, let alone get at it in case it needs attention. The writer not long ago stopped to lend a helping hand to a man whose car was stalled on the road. After hearing the symptoms the case was diagnosed as timer trouble. Sure enough, it was found at the rear end of the camshaft covered with all kinds of mire. The screws holding the main case or shell had dropped out so that the case was just hanging by the wires. Was there a tool on the car with which the screws could be replaced? No, indeed. There was no room to get even a short screwdriver in between the flywheel and timer. An offset screwdriver was improvised by bending an old button hook and hammering the end flat, and in this way the timer was again put into commission temporarily and the man sent on his way rejoicing. Cheapness is about the only excuse which can be given for such a location.

When the magneto is located so far down on the crankcase as to be hard to get at, it is usually argued that it never needs attention. This may be true of a few magnetos, but where something goes wrong about the ignition few drivers are satisfied until they have at least examined the adjustment of the contact-breaker. In ninety-nine cases out of a hundred it is true that the magneto is not at fault, but that fact does not seem to decrease the number of times it is inspected. It may be argued that by putting it in an inaccessible location it is least apt to be tinkered with unnecessarily. But on the other hand it may be said that when placed where its inspection can be easily accomplished, the driver can see that it is properly adjusted and is more apt to let it alone instead of guessing, when he can't easily see, that it is not right and then proceeding to misadjust what was really O. K. at first.

Nuts on Magnetos

How many magnetos are held in place by bolts put in from below, where it is simply impossible to even tighten them when the motor is in its place on the chassis?

How many water pumps are placed so that they may be removed without disturbing the magneto or taking off the water inlet manifold? In some cases the only thing which prevents is the fact that the

couplings at either end of the pumpshaft are so placed with respect to each other that they will not both slide out at the same time. It seems strange that any designer or maker could overlook such easily remedied troubles.

The carbureter adjustments are, as a rule, quite easily gotten at from above, yet on a goodly number of cars one almost has to stand on his head in order to adjust the carbureter.

How many motors with overhead valves have the adjustments for same down near the crankcase when they might just as well be at the upper ends of the push rods, where they would be much more accessible?

Insides of the Cylinders

While discussing the motor, think how some have to be almost completely torn down in order to get at the inside of the cylinders to take out a broken cam, to replace a burnt-out bearing or to remove some stoppage in the oil pump? Last year the makers of at least one very popular car contended that the gear pump for oil circulation was so trouble-proof that it could with impunity be placed in the most inaccessible position inside the case. This can no longer be said regarding the 1910 model of the car referred to, yet another 1910 make of car shows almost the same troublesome feature which has just been discarded from the first mentioned.

Again, first count the number of different kinds and sizes of wrenches required to tear down and reassemble some motors and then see how many could have been discarded had the designer given a little thought to using fewer different-sized nuts.

Can you actually remove the sod pan from your car and then replace it without tools, or was that only an idle dream of the salesman? There is no reason whatever why there should be the trouble there is in regard to this particular.

Gasoline Cut-Off Valve

Doesn't it seem odd that any maker should so locate the gasoline cut-off valve that it cannot be gotten at without get-

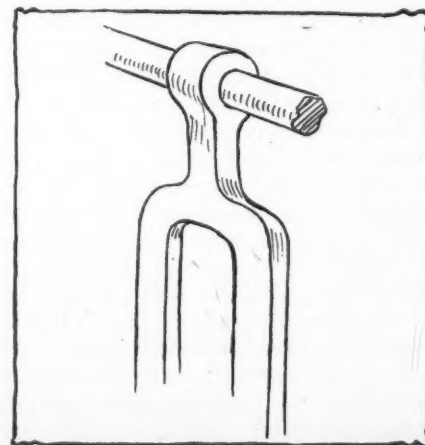


FIG. 2

Michigan Using Free Labor

Grand Rapids, Mich., Dec. 27—Under authority given by the last legislature, when it amended the law of 1846 in regard to county jails and their regulation, many counties of Michigan are securing free labor in the construction and repairing of their highways. And now every man who is sentenced to a county jail may be called upon at any time to get out and do his share toward bettering the roads of Michigan. Several of the counties, including Eaton and Jackson, already have taken advantage of the amended statute and in these counties the results have proved satisfactory.

The amended law provides that the board of supervisors of any county may order that any or all male prisoners over the age of 18 years, in any county jail, with the exception of those prisoners awaiting trial or those confined under civil warrant, shall be required to work upon the public highways, streets, alleys and public roads in any township, city or village in the county, or in any quarry, pit or yard in the preparation of materials for such highways, streets or alleys. Under the law, after the resolution has been passed by the supervisors, the highway commissioner may make application to the sheriff to have such prisoners work on any designated road, street or alley. The location of the township, city or village where the prisoners shall work is a matter resting with the board of supervisors.

While at work the prisoners are to be under the custody of the sheriff, and he may take such steps as he deems necessary to prevent their escape, although he cannot engage extra deputies without the consent of the board. The board may designate other places than the jail where the prisoners may be confined nights while working on the roads. The expenses of transporting the prisoners to the sections where they work are paid by the county, the sheriff being required to furnish only such meals as they would receive if they were confined in jail.

No prisoner is to be entitled to any compensation for such work. The sheriff is required to keep a record of the number of prisoners employed on the roads and the number of days the prisoners are so employed, and is required to make annual reports to the boards of supervisors.

Grand Traverse county is the latest to join the good roads counties of the state. It is now operating under the county road system. Work on roads was begun late this fall, but an energetic campaign is planned for next year.

ting in under the car and perhaps even dropping the sod pan? Imagine the language which would be used by anyone unfortunate enough to have the gasoline pipe break off at the carbureter connection, for instance, and have to take the time and trouble to get at a valve, located as above,

before he can stop the loss of perhaps a limited supply of gasoline.

Think of 1910 cars leaving the factory without any adjustment whatever between the cone clutch and the pedal for taking up clutch wear, which is sure to occur sooner or later. Yet such is the case. How simple to substitute a clutch yoke similar to Fig. 1 instead of Fig. 2. The agents will almost force the company to make some such substitution where no adjustment has been provided. And in the same model it is almost necessary to get under the car to gain access to the brake-rod turnbuckles, which offer the only means of adjustment. This is because they are at the forward end instead of at the rear, where they might be easily gotten at. And again, how much more accessible is a transmission brake where, by lifting one floor board, it may be adjusted through the means of a wing nut, and this without the use of any tools.

Perhaps if you have read this far you will say, "Stop knocking and give remedies." The writer believes that in practically every instance cited the remedy is so evident that it would be unnecessary if given. The article is given not with the idea of offending any, but with the hopes that the points mentioned will call the attention of some manufacturers to what they have evidently simply overlooked.

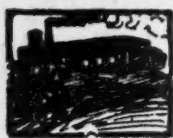
PORTLAND SHOW PLANS

Portland, Ore., Dec. 23—Over forty dealers have spoken for space in the show to be held in the Armory January 24-29. Fully 170 cars will be on exhibition. The floor space was auctioned off, over \$20,000 being realized from the sale. Manager Lipman expects to spend \$10,000 on the decorations. One of the features of the show will be an office in charge of E. Henry Wemme, president of the Portland Automobile Club. From this point of vantage the active campaign for raising the required funds for the construction of the Mount Hood and Hood river roads will be waged for which \$2,500 has been subscribed; \$5,000 is required. It is proposed to have the road signs as to direction painted one color and a different color on each road. In this way it will not be necessary to stop and read the signs, but just note the color. At crossings where there should be a turn at right angles there will be a post and the motorist knows where to turn. Where there is a post the indication is to proceed forward. This system has already been agreed upon by the commissioners of Multnomah county, and the balance from the funds of the show will be used in purchasing signs, the county having agreed to erect them. The management of the show has decided not to allow curb brokers' entries and to this end a regulation was made that no dealer who had not been located in Portland 60 days prior to the show will be permitted to buy floor space.

Dealers Want Club House

Philadelphia, Pa., Dec. 26—At the recent annual meeting and election of the Philadelphia Automobile Trade Association the showing made by the organization was so encouraging and future prospects so bright that the much-discussed project of a clubhouse, when revived, found a large majority of the members in a receptive attitude, and as a result President Wister appointed W. I. Foss, Allen Sheldon and A. E. Maltby a committee to secure suitable quarters. This committee went to work at once, and after a thorough search, secured a lease on a portion of the building now in course of erection at the southwest corner of Broad and Callowhill streets, about midway of the row. The plans contemplate a suite extending across the entire front of the building with meeting, committee and dining-rooms, secretary's quarters, kitchen, lavatories, etc. Here will be established a clearing house for the local trade, and quarters for visiting tradesmen. Secretary J. H. Beck will be on duty constantly, and it is proposed to ultimately extend the accommodations to include a comprehensive motor library and tourists' bureau, where travelers may obtain information of all kinds. The new quarters will be ready for occupancy about March 15.

Philadelphia's quartet of clubs apart from their usual winter social activities, are busy to a degree. The Automobile Club of Philadelphia, at its last meeting of the board of governors, when a total membership of 1,014 was announced by President Powell Evans, gave evidences of waking up to its responsibilities as the largest club in the state of Pennsylvania by taking the initiatory steps toward the acquirement of a clubhouse. Chairman D. Braden Kyle, of the club garage committee, has been quietly looking over the possibilities in the center of the city for many months, and is nearly ready to announce his plans, which include, besides the usual accessories of the present-day clubhouse, a library, squash and handball courts and several other novelties. The Automobile Club of Germantown, which has been steadily expanding from the day it first opened its doors, and has twice been compelled to enlarge its handsome clubhouse at Carpenter and Emlen streets, is now negotiating with the architects for a further addition, 62 by 90 feet and two stories in height. Work on the new section will be begun early in the new year. The Quaker City Motor Club's clubhouse project is hanging fire temporarily, with a likelihood that something definite will be sprung at the annual banquet January 6 next. The Century Motor Club, the baby of them all, after a mix-up with Chairman Hower, over the sanction, is hard at work on the details of its New Year's run, which is expected to be a good one and in a measure replace the fixture abandoned by the Quaker City Motor Club.



Among the Makers and Dealers



Gets the Mitchell—George O. Barnes, Portland, Ore., has secured the agency for the Mitchell car.

Two More for Benjamin—C. Arthur Benjamin, agent for the Packard in Syracuse, N. Y., has added the Haynes and Overland to his list.

Also Handling a Truck—The Polson Implement Co., of Seattle, Wash., in addition to the other makes of cars handled, will have the agency for the Randolph truck.

East End Colony—The Pittsburg Motor Car Co. has been organized by James B. White, E. L. DeVore and A. J. Paige, of Pittsburg, and will have a large garage in the east end district.

Closes for an Electric—The Hughes Motor Car Co., of Minneapolis, with a capital of \$50,000, will be organized to sell Rauch & Lang electrics. M. L. Hughes is one of the promoters.

Has a New Garage—The new garage of the Bryant Motor Car Co., of Waterloo, Ia., is 40 by 140 and equipped with all the modern conveniences. The company is agent for the Chalmers-Detroit and Hudson.

Will Have the Krit—George A. Crittenden, sales manager of the Boston agency of the American car, has just returned from Detroit, where he closed a deal to handle the Krit car throughout New England.

Will Make Trucks—McAllister Brothers have bought, for \$35,000, 101 by 142 feet on Baum street, near Beatty street, Pittsburg, where they propose to fit up a large plant for the manufacture of commercial vehicles.

Lambert Appointees—Following is a list of new dealers for Lambert motor cars: N. T. Gill, Reedsburg, Wis.; D. Elmer Roberts, Racine, Wis.; Ed. Shambau, Two Rivers, Wis.; Brillion Iron Works, Brillion, Wis.

Representing the Reliance—H. T. Boulden, formerly connected with the Rapid Motor Vehicle Co., at Pontiac, Mich., is now representing the sales department of the Reliance Motor Truck Co., of Owosso. Boulden is on a southern trip for the purpose of establishing selling agencies for his company at Cincinnati, Louisville, Atlanta and Jacksonville, Fla.

New Boise Concern—The L. M. Dull Automobile Co., Ltd., has been incorporated at Boise, Idaho, for \$25,000. The company will build a garage at Tenth and Grove streets which will cost in the neighborhood of \$20,000. The agency for the Cadillac has been secured and Manager L. M. Dull will attend the New York show in order to make other connections. The



HARTFORD TIRE'S CHICAGO BRANCH

directors of the new company are L. L. Ormsby, C. R. Shaw, Craig Coffin, L. M. Dull and R. T. Hummel.

Goes to Beaver Falls—The Standard Connecting Rod Co., Beaver Falls, Pa., has bought a large property on lower Ninth street, in that city, and will build a big addition to its plant to be used for manufacturing motor cars.

Hartford Wants Mechanics—Hartford manufacturing interests are enjoying a boom just now and 300 skilled mechanics are wanted. The motor car industry and kindred interests in the Connecticut city are in a flourishing condition at the present time.

Two More for Minneapolis—Two more makers of motor cars have entered the northwest market, with headquarters in Minneapolis. The Royal Automobile Co. has taken on the Glide, and the Pagel-Allen Co. has obtained the agency of the Demotear.

Activity at Flint—The new No. 4 plant of the Weston-Mott Co., at Flint, Mich., now is in operation. The plant is for the manufacture of rims and hubs exclusively. New machinery is being installed as fast as possible. Work on still another new plant is being rushed. The Buick company has just completed a waterworks system of its own at a cost of half a million dollars and this will not serve the motor car plants alone but will be used by all the allied industries in the north end of the city. The source of supply is the Flint river. The Weston-Mott company has introduced a feature in the line of industrial welfare, which promises to be of great educational

value to the employees. This innovation is in the nature of a circulating library of technical literature.

Has Reo in Hartford—Russell Tabor has taken the agency for the Reo in Hartford, Conn., and has opened a salesroom at 1100 Main street, formerly occupied by the Elmer Automobile Co., which have moved into the Ashwell garage.

Altoona's Latest—The Keystone Motor Car Co., of Altoona, Pa., has secured the agency for the Mitchell and Columbus electric. It now is having plans drawn for a garage 50 by 100 feet on Eighteenth street. E. E. Clark will be manager.

Making a Special Motor—Kahlenberg Brothers, of Two Rivers, Wis., manufacturers of engines for motor cars and boats, have completed a special design four-cylinder engine for a company at Charleston, S. C., which intends to engage in the motor car business.

Hipple at the Head—The Chalmers-Detroit representatives in Philadelphia have reorganized under the name of the Chalmers-Hipple Motor Co., with Hugh Chalmers, of Detroit, and George W. Hipple, of Chicago, as the moving spirits in the new deal.

Building a New Truck—The Weyher Machine Works, at Whitewater, Wis., is testing an 18-horsepower ½-ton motor truck built in its shops as the first of 500, all of which have been contracted for. The truck is designed for light deliveries and farmers' use.

Worcester's New Garage—The contract for what will be the largest garage in Worcester, Mass., and probably in central Massachusetts, has been let by the Norcross Automobile Co. It will be a two-story and basement stone building at Commercial Exchange and Cypress streets. The Norcross company is agent for the Buick and Oldsmobile in Worcester and Worcester county, and will devote two-thirds of the new building to a display room.

Kansas City Moves—The Inter-State Automobile Co. has taken the agency of the Broc, an electric made by the Broc Wagon and Carriage Co., of Cleveland, O. The Inter-State company now handles the Inter-State, the Parry, the Buffalo truck and the Broc electric. W. L. Alderson and R. Raymond Riffe have organized the Standard Motor Sales Co. and taken the agency of the Continental 35. The Carter-car Co. is now representing the Selden in Kansas City. Plans have been accepted and work ordered to start on the new home of the Hathaway Electric Car Co., Thirty-fifth and Main streets, which handles the Detroit electric. O. V. Dodge, Jr., has bought out the Imperial Motor Car

Co., agent for the Woods electric, and has employed Guy W. Morgan to manage it for him.

Making a Four-Wheel Drive—A new type of four-wheel drive motor truck has been designed by B. J. Eckhardt, of Milwaukee, Wis. It is proposed to organize a manufacturing company, and the plant will no doubt be located in Manitowoc, Wis., former home of the inventor.

Has Parry in Baltimore—New agencies and new cars continue to invade Baltimore. The latest arrival is the Parry, which is being handled by the General Auto Co., with Joseph M. Wright as manager. The company has opened headquarters at 12 West Eager street.

Smithson Becomes a Texan—George Smithson, veteran of numerous pathfinding and reliability runs, has gone to Dallas, Tex., to accept an advanced position with the Studebaker agency in that city. Smithson has been a right-hand man in the Studebaker demonstration work for 6 years.

Is a Garage Only—Work on the E. B. Parker garage, Minneapolis, is progressing with such rapidity that it will be opened soon after January 1. The garage is 125 by 167 feet. Mr. Parker will not handle cars for sale, but will devote his time to the patrons of the garage and storage departments.

Needs More Room—The Lovell-McConnell Mfg. Co., having outgrown its present factory, is building a new plant on Emmet street, Newark, N. J., for the manufacture of Klaxon horns and other accessories. The machine shop will be 200 by 50 feet, two stories and basement, and the foundry 75 by 40. There also will be a power plant building, a fireproof building for storing excelsior, and a private garage.

Speedwell Agency Moves—The Speedwell Motor Car Co. of Chicago, which is building a new home in the southern end of the row, has moved from its old quarters at 1355 Michigan avenue to 1407, the old Maxwell quarters, which were left vacant when the Maxwell company moved into its new store at Eighteenth street last week. The Speedwell company will remain at 1407 until its new home is completed.

Talking Plant in Texas—With the view of handling a portion of the trade of Mexico, Cuba and Central American countries, a representative of one of the large motor car factories of the north has been in Galveston a few days on business pertaining to the building of a branch factory there to cost in the neighborhood of \$250,000. He is on the lookout for a suitable site and is also endeavoring to interest some of the business men in the proposition. There are two or three car factories in successful operation in cities of Texas, and it is thought that Galveston, having direct steamship connection with Mexico, Cuba and Central America, would

be an excellent location for an establishment desiring to enter that field in an active manner.

Starts at Erie—J. F. Van Cleave, John S. Rilling and others, of the Erie Engine Works, are forming a \$50,000 company at Erie, Pa., to manufacture motor cars. The company will use for the present a plant at Twenty-fifth and Ash streets which formerly was occupied by the Erie City Carriage Co.

Tire Repairs a Specialty—Carl Jones and Louis Indra, of Green Bay, Wis., have opened their new garage, known as the West Side garage, on North Broadway, Green Bay. The company, besides doing an agency business, will conduct a livery, and has a large repair shop, with tire repairs a specialty.

May Get Great Smith—Representatives of the Smith Automobile Co., of Topeka, Kan., are practically sure of securing a site in Monroe, Mich., for a plant. It is said that, should the company decide to remove, the city of Monroe will pay all the expenses of moving. The company employs 300 men.

Syracuse Change—The partnership of Willis & Van Bruit, selling agents for the Oldsmobile and Oakland in Syracuse, N. Y., has been dissolved. Hereafter it will be known as the Willis Motor Car Co., with T. F. Willis as the sole owner and agent, selling the Oldsmobile in ten counties of central New York.

Milwaukee Merger—An important agency change has been made in Milwaukee, Wis., by which the George W. Browne Motor Co., 226-228 Wisconsin street, is merged with the Bates-Odenbrett Auto Co., 503-507 Broadway. The alliance will be known under the name of the latter concern. By this merger, the Marion and Overland agencies, held by the Browne company, will go to the Bates-Odenbrett Auto Co., representing the Winton. The Bates company no longer will handle the Buick. George W. Browne will be wholesale manager for the Bates-Odenbrett Auto Co., and Charles R. Johnson con-

tinues as city sales manager. Richard Bates will continue as president and general manager.

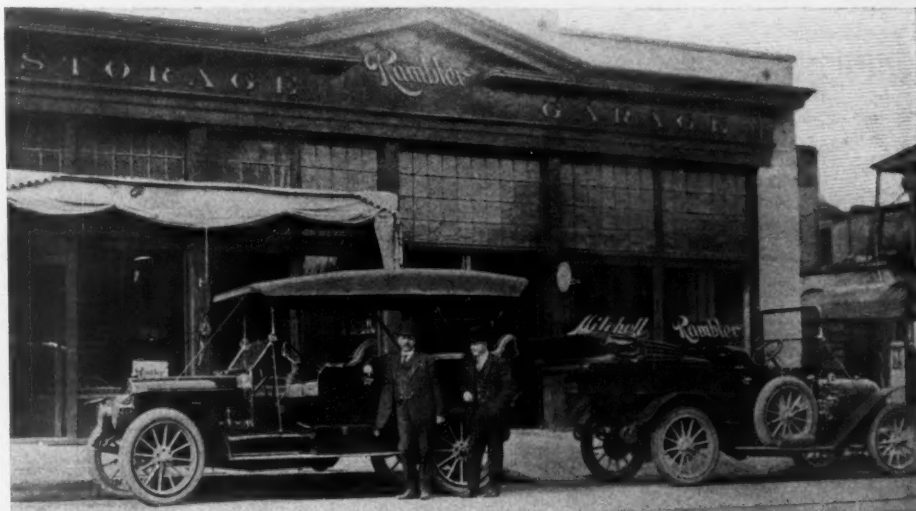
Washington in Baltimore—Baumann & Lilly, of Baltimore, Md., have closed for the Maryland agency for Washington cars, manufactured by the Carter Motor Car Corporation, of Washington, D. C., whose factory is located about 6 miles outside of the town at Hyattsville, Md., practically a Washington suburb.

Joins Portland Trade—The Willamette Auto Supply Co. is the latest to join the ranks of dealers in Portland, Ore. The new firm will have the agency for the McIntyre. B. R. Gunther and W. B. Neff, the latter northwest manager for the McIntyre, compose the firm. A definite location has not as yet been decided upon.

Riggs Building Garage—The Packard Automobile Co. will build a large garage at once on Twenty-third street, near Washington, Portland, Ore. The structure will be a two-story brick with reinforced concrete floor, for both garage and salesroom. It will cost \$29,000. Frank C. Riggs is the local agent of the Packard company.

Building a Studebaker Garage—The Studebaker Motor Sales Co. has been organized at McKeesport, Pa., by C. E. Watson, of that city, and will erect a large garage at once. It will have the Studebaker agency for Elizabeth, Braddock, Glassport, Turtle Creek, Duquesne, Wilmerding, Dravosburg and McKeesport.

More Room for Rutenber—The Western Motor Co., maker of Rutenber engines, has found that its plant at Logansport, Ind., is running at its fullest capacity, and so it has added a new factory at Marion, which will be devoted entirely to the manufacture of the Rutenber. Both plants will be supplied with material from the company's foundry at Logansport, which has capacity enough for the purpose. The new Marion plant is made of concrete, the designs being supplied by the Kahn system, of Detroit. The present officers of the Western Motor Co. are: President, F. B. Wilkinson; vice-president, J. F. Digan;



HEADQUARTERS OF THE RAMBLER IN DENVER



EMPLOYEES OF HARROLD'S MOTOR CO., PIERCE-ARROW AGENT IN NEW YORK

secretary, E. H. Wolcott; treasurer, J. W. Stephenson, and mechanical engineer, E. A. Rutenber.

Secures Eastern Representation—P. W. Strong, general sales manager for the H. E. Wilcox Motor Car Co., of Minneapolis, has returned from a 2 weeks' trip through the east, where he visited New York, Boston, Albany, Troy, Baltimore, Philadelphia and other cities. Agencies for the Minneapolis cars were established in practically all of these cities.

Will Retain Matheson—The Wayne Davis Motor Co., which recently acquired the Philadelphia agency for the Everitt 30, will continue to represent the Matheson. Mr. Davis has been sales manager for the last named car in the Quaker City during the past year, and will continue business in the present quarters at the northwest corner of Broad and Green.

Truck Company Moves—The United Vehicle Co., recently formed in Boston to produce commercial vehicles, has moved from State street, the business district, to Massachusetts avenue, where it will be in closer touch with the motor field. That will be the headquarters of the company. An addition has been planned for the factory recently purchased at Woodville, Mass.

More Stewart Branches—The Stewart & Clark Mfg. Co., maker of Stewart speedometers, is opening branch offices on the Pacific coast, one in San Francisco and one in Los Angeles. The coast trade heretofore has been handled through Hughson & Merton. The company's branches will be in charge of Mr. Pelton, former sales manager of the Auto Vehicle Co., Los Angeles.

Now Has American and Sterling—The United Motors Co., of Chicago, handling the Sterling, has added to its line the American, which heretofore has been handled in the Windy City by the Kope-meier company, which represents the American in Illinois and Wisconsin. Robert Drach, who has been at the head of the Kope-meier interests in Chicago, will become a traveling representative for the American, and besides selling the product will drive the cars in contests

during 1910. The United Motors Co. will occupy the entire building at 1507 Michigan avenue.

Making Brass Parts—The Attwood Brass Works, of Grand Rapids, Mich., has begun the manufacture of brass motor car parts, handles, hand rails and similar articles. Since the manufacture of these commodities was begun the business has doubled and enlargements of the plant are under consideration. The Keeler Brass company also is producing motor car parts in addition to its line of furniture hardware.

Working a Night Shift—The Midland Automobile Co., at East Moline, Ill., has leased the large American Harvester building as a supply room. The building is one of the largest of its kind in Moline or East Moline. A night force of twenty men has been put to work at the plant. The day force of seventy-five men has been unable to keep up with the orders for cars, although working 11 hours daily. The night shift will be employed all winter at least, and perhaps longer.

Albany Branch Opened—The Albany branch of the Maxwell-Briscoe company, known as the Maxwell-Briscoe Albany Co., has been formally opened. While the company has been in there some time, it is only for the past few days that it has had the full occupancy of the building and the organization completed. W. H. Hadley is in charge of the Albany branch, in which he is also financially interested. Associated with Mr. Hadley are W. A. Hamilton, in the capacity of secretary, and Andrew Bender, superintendent of the repair and mechanical department.

Omaha Prepares for Show—At a meeting of the Omaha Automobile Show Association the following officers were elected: President, J. J. Deright; vice-president, J. T. Stewart; secretary and treasurer, C. G. Powell. A board of directors was elected, consisting of the following: J. J. Deright, C. G. Powell, Willard Hosford, J. T. Stewart and T. R. Kimball. There are at the present time twenty members of the association, and application for membership are nearly that many. The Auditorium as arranged last year will be unable to accommodate the coming show,

and a number of changes will be made. The space beneath the stage will be utilized for a commercial vehicle exhibit.

Owosso Company Formed—The Owosso Motor Co., of Owosso, Mich., capitalized at \$25,000, has been formed. It will soon commence the manufacture of light trucks and motor delivery wagons. The company proposes to build cars and has secured a factory. C. V. Richardson and E. M. Clarke, formerly with the Reliance Motor Truck Co., are looking after the mechanical end of the company.

Webb Moving to St. Louis—The Webb Motor Fire Apparatus Co., of Vincennes, Ind., which several weeks ago announced it would move to St. Louis, has obtained a 5-year lease on a building at Vandeventer and Washington avenues, St. Louis. A. C. Webb, president of the company, is superintending the remodeling of the building, and the plant is to be put in operation as soon as possible.

Pierce-Arrow Workmen—That the matter of representing a well-known make of motor car in any of the larger cities is not merely a matter of opening an office and doing some advertising is shown by an accompanying photograph of the employees of the mechanical department of the Harrolds Motor Car Co., New York dealer in Pierce-Arrow cars. The photograph showing the mechanical department in one city gives an idea of the great organization that is necessary in the entire country.

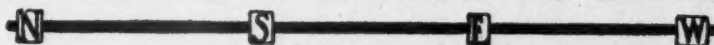
St. Louis Changes—The Central Garage Co., of St. Louis, has closed a contract to handle the Sterling car. George E. Swope, recently of the Kansas City Buick branch, has been transferred to the company's offices in St. Louis as general salesman. Milton B. Strauss, until recently manager of the Buick's Little Rock agency, also is to be with the company's agency in St. Louis as retail salesman. The Missouri Automobile Co. has closed a contract to handle the Westcott car in St. Louis and adjoining territory.

Fort Wayne Has New Plant—A motor car manufacturing company with a capital stock of \$200,000 is being formed in Fort Wayne, Ind. The plant will be located in the building now occupied by the city carriage works and the factory will start with 150 employees. The carriage works will move to another location. Practically all of the stock of the new concern has been subscribed for.

Whitlock Election—At a recent meeting of the directors of the Whitlock Coil Pipe Co., of Hartford, Conn., the resignation of President and Manager Arthur S. Hyde was accepted. As yet no successor to Mr. Hyde has been appointed and probably will not be for some time to come. James L. Goodwin was re-elected treasurer and also manager. The following officers were elected: Vice-president, C. E. Beach; secretary, John B. Murphy; treasurer and manager, James L. Goodwin. E. R. Mertens has been appointed superintendent.



From the Four Winds



Invents Guide Post—L. C. Hammel, of Appleton, Wis., has invented a guidepost for country roads. The post is of cast steel, with a shoe of cast iron. The arms are so arranged that separate letters may be placed in them to form names and distances, instead of being painted.

Irish Locals Going—Motor handcars to replace the Irish locals in use on the Galena division of the Northwestern railroad are to make their appearance in a short time. Roadmaster Bowen, of the road, tried out one make recently and was well pleased with the result. It is probable he will conduct a series of tests to determine what make of motor will be used in the handcars.

Winter Run Proposed—There is some talk of holding another winter endurance run this season. One was held last season, the route being from Hartford, Conn., to Springfield, Mass., by way of Pittsfield, and then to Hartford. If such a contest is held this winter, a different route will be chosen, in all probability. Should the same old route be used, the fact that Jacob's ladder is now eliminated will render it less difficult.

St. Louis Show Space Gone—From present indications the St. Louis show, which is to be held in the First Regiment armory in February, will surpass anything St. Louis ever has witnessed in this field. There have been seventy applications for space on the show floor. Of these fifty-four wish to exhibit cars and the others accessory manufacturers' products. The show committee has found the applications exceed by far what was expected, and for this reason the space which was to be allotted to each individual exhibitor will have to be cut down.

Criticises the Commission—The good roads commission of Maryland came in for harsh criticism at the hands of Daniel W. Doub, of Hagerstown, at the annual meeting of the Maryland State Turnpike Association at Frederick, Md. He declared that the people consider the commission as a scheme of politicians of the dominant party and that they, the people, are powerless to prevent the exploitation of the \$5,000,000 good roads loan. Mr. Doub pointed out that at the rate the commission was spending the money another loan of \$6,000,000 would be necessary to complete the work contemplated, whereas, he contended, the national turnpike from Baltimore to Garrett county could be repaired at a cost of \$1,000 to \$1,500 per mile and made as good and durable as any new road. At the rate the commission is going, said Mr. Doub, the people are paying \$11,600 per mile in constructing the pike as a model road. The association

passed resolutions urging the repair work at the low cost and condemning the "socialistic spirit, which seeks to confiscate for the public use the private property invested in the turnpike companies, which largely built up Baltimore city and the state of Maryland."

Abas the Horse!—R. A. Douglas, chairman of the police committee of Moline, Ill., is advertising for bids for a 45-horsepower motor police patrol and ambulance. The city council at Moline has decided that the growth of the city makes it impracticable to use the horse longer on the patrol and has taken this means of settling the question. Bids will be received until 6 o'clock in the evening of January 24, 1910. Provision is to be made for a 6-foot stretcher and the car must be covered in the same manner as the ordinary police patrol.

Syracusan Gives Cup—B. E. Watson, a member of the board of directors of the Automobile Club of Syracuse, of Syracuse, N. Y., has donated a silver trophy for annual competition among the members of the club. The nature of the contest is to be decided each year by a committee of five named to take charge of the trophy events. Three successive winnings constitutes permanent possession of the cup. An active membership campaign is being waged by the officers of the club. At the beginning of 1909 the roll totaled only a few over 200, but with the close of this year it is expected the 400-mark will have been passed. There are now 380 on the list and new names are being received every day. The annual meeting and din-

ner will be held next month, when it is expected a decision to appoint a permanent paid secretary will be reached. The first number of the club's new paper, the Spark Plug, will be issued on the first of the year.

Maps for Motorists—The Hartford Rubber Works Co. has provided each member of the Automobile Club of Hartford with a route map covering the roads from Hartford to Providence and so complete is the map in detail that to get lost is almost an impossibility. One simply has to be one capital city to the other by using the Hartford maps.

Esperanto Cabs Now—One of the new motor cabs to appear on the streets of Paris is the Esperanto. This does not mean that the machine is of that make. Esperanto is the universal language now in use in Europe and the sign on the cab means that the driver of it speaks Esperanto. The sign is intended to let the tourist in search of transportation know this fact.

Canadian Show Dates—The Canadian show will be held in the St. Lawrence arena, Toronto, under the auspices of the Ontario Motor League, from February 24 to March 3. E. M. Wilcox, secretary of the league, will be manager. In all probability there will be a shortage of space, although there are some 30,000 square feet available in the building. The Ontario Motor League proposes to have the annual convention of members and others interested in good roads during the week of the show.



FRENCH CAB WHOSE DRIVER SPEAKS ESPERANTO



Brief Business Announcements



San Francisco, Cal.—N. B. Taylor has been appointed local agent for the Midland.

Lansing, Mich.—The Eby Auto Parts Co., of Detroit, has been incorporated with a capital stock of \$2,000.

Augusta, Ga.—The Ashley Motor Co., of Charleston, has been incorporated by the secretary of state, with a capital stock of \$1,000.

Caledonia, N. Y.—J. V. Locklin has purchased a 200-foot front lot on State street and is planning the erection of a garage there.

New York—A. C. Banker, who is the agent in this city for the Regal Motor Car Co., of Detroit, is shortly to open salesrooms at 1720 Broadway.

Detroit, Mich.—The Great Western Auto Co. has established an agency at 878 Woodward avenue, the firm consisting of Adam Seer and Thomas Agnew.

Trenton, N. J.—The Howard Demountable Rim Co., of this city, has been incorporated with a capital stock of \$200,000 and is to manufacture demountable rims.

Philadelphia, Pa.—The Howard Demountable Rim Co., of Trenton, N. J., has made arrangements for the establishment of a local agency. H. T. Eisenberg is to act as manager.

Albany, N. Y.—The Bonner Automobile Co., of Brooklyn, has been incorporated with a capital stock of \$2,500, by J. G. Gastelger, J. W. Gastelger and C. L. Bonner, all of Brooklyn.

Omaha, Neb.—H. H. Van Brunt has leased the Rogers building on the south side of Farnum street, near Twenty-second, and will open up with a full line of Overland cars, as well as carrying supplies of all kinds.

Lansing, Mich.—Another new company which has filed articles of incorporation is the Reynolds Motor Co., of Detroit, which has a capital stock of \$40,000. Robert Reynolds, of Detroit, is named as the principal stockholder.

New York—According to the first annual report of the Fifth Avenue Coach Co. the concern has a total investment of \$400,000, or \$230,000 more than in 1908, the increase being for the purchase of the new motor omnibuses. The total revenue was \$369,405, and the expenses aggregated \$225,566, leaving an income of \$144,700.

McKeesport, Pa.—A new company has been organized here under the name of the Studebaker Motor Sales Co., to be a subsidiary company of the Studebaker Automobile Co., and to devote its entire attention to furthering the interests of the Studebaker car in this vicinity. C. E. Wat-

son, formerly connected with the National Tube Co., is to be the manager of the new concern.

Tarkio, Miss.—The Tarkio Automobile Co. is commencing the erection of a one-story garage on Third street.

Birmingham, Ala.—R. T. Peckham, who is the agent in Atlanta for the Pullman car, has just established a branch in this city.

Boston, Mass.—The Austin Co. has been organized to act as agent for the Austin and has established headquarters at 94 Massachusetts avenue.

Austin, Tex.—The Waco Automobile and Supply Co., of Waco, has been incorporated with a capital stock of \$7,000, by G. Roper, Sr., G. Roper, Jr., and B. A. Hayes.

Pittsburg, Pa.—The Premier Sales Co., which is the agent in this city for the Premier and Reo, is preparing to remove to new and improved quarters at Mignonette and Beatty streets.

Indianapolis, Ind.—The Kohl Mfg. Co., of this city, has been incorporated with a capital stock of \$10,000, and is to engage in the manufacture of accessories. The incorporators are J. A. Aaron, A. W. and M. F. Kohl.

Harrisburg, Pa.—The Packard Motor Car Co., of Philadelphia, has been incorporated with a capital stock of \$10,000. Another new company to file articles of incorporation is the Wilkes-Barre Automobile Co., of Wilkes-Barre, which has a capital of \$5,000.

Kansas City, Kan.—The Stafford Motor Car Co., of Kansas City, has recently been organized with a capital stock of \$100,000, fully paid up, and will take over the property of the Stafford Motor Car Co., of Topeka. The plant will be removed to Kansas City about January 15, the plant

to be in operation by February 1. Terry Stafford, of Topeka, is to be the president of the new concern.

Boston, Mass.—The Corley-Coughlin Co., agent for the Velie, is about to move into its new garage at 21 Hawkins street.

Detroit, Mich.—The Michigan Motor Sales Co., which has the agency for the Oakland and Welch, has completed the fitting up of a repair shop.

San Francisco, Cal.—Tracy Holmes has just been appointed representative in this city for the Corbin and is preparing to open headquarters on Van Ness avenue.

San Francisco, Cal.—The Haynes Auto Sales Co., which has just been appointed local agent for the Haynes, has opened headquarters on Golden Gate avenue, near Van Ness.

Alma, Mich.—The Cameron Car Co. has been offered a bonus of \$250,000 in real estate and \$100,000 in cash to locate in this city. A large gas engine plant is to be fitted up for the manufacturing of the Cameron car.

Harrisburg, Pa.—The Auto Acetylene Co., of Pittsburg, has been incorporated with a capital stock of \$5,000. The Pennsylvania Auto Motor Co., of Philadelphia, has announced the increase of its capital stock from \$300,000 to \$500,000.

Boston, Mass.—C. G. Andrews has been appointed manager of the new Overland branch which, for the present, will be located at 24 Columbus avenue. As soon, however, as the necessary changes are made, the company will remove to 161 Columbus avenue.

Louisville, Ky.—The Atlas Machine Co., which is now representing the Empire 20, has been appointed agent in this city for the Marmon. The Atlas company has removed to 735 West Market street and intends to open a garage and salesroom on Third or Fourth avenues.

Utica, N. Y.—The Ford Sales Co., local representative of the Ford and Reo, has found its business increasing at such a rapid rate that it has been obliged to enlarge its quarters. In the future the repair shop will be located at 514 Columbia street, and the entire space of its present establishment will be devoted to the salesroom.

Kokomo, Ind.—The factory space of the Apperson factory here has been more than doubled by the erection of two three-story buildings, 60 by 160 feet, which have just been completed, and the leasing of a third building for the use of the testing department. This has permitted an entire reorganization and rearrangement of the plant.



New York—National Auto Supply Co.; capital stock, \$25,000; to engage in the business of selling supplies, motor cars, etc. Incorporators, A. Holzman, P. B. Holzman and S. D. Holzman, all of New York city.

Indianapolis, Ind.—Stutz Auto Parts Co.; capital stock, \$10,000. Incorporators, H. F. Campbell, M. C. Stutz and C. E. Stutz.

Camden, N. J.—Philadelphia Sight-Seeing Corporation; capital, \$50,000; to operate motor cars for touring and sight-seeing purposes. Incorporators, F. R. Hansell, G. H. B. Martin and W. F. Eideil.

New York—Flandrau Motor Car Co.; capital stock, \$52,500. Among the directors is Kenneth C. Wilson, of Brooklyn.

Franklin, Ky.—Enterprise Machine & Garage Co.; capital stock, \$10,000; to deal in motor cars, supplies and accessories and will also do a general repair business. Incorporators, W. H. Winfield, H. Mullins and B. Harris.

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**Mayo Radiators
are best**

If you once get this fact firmly fixed in your mind possible radiator troubles will either be a thing of the past or of your own choosing.

The Quality of Mayo Radiators is fixed and their price based on that quality. Where Quality precedes price Mayo Radiators take precedence. Write us for 1910!

MAYO RADIATOR COMPANY, New Haven, Conn.



THE BEST



BRAKE LINING—FRICTION FACING

Raybestos
TRADE MARK

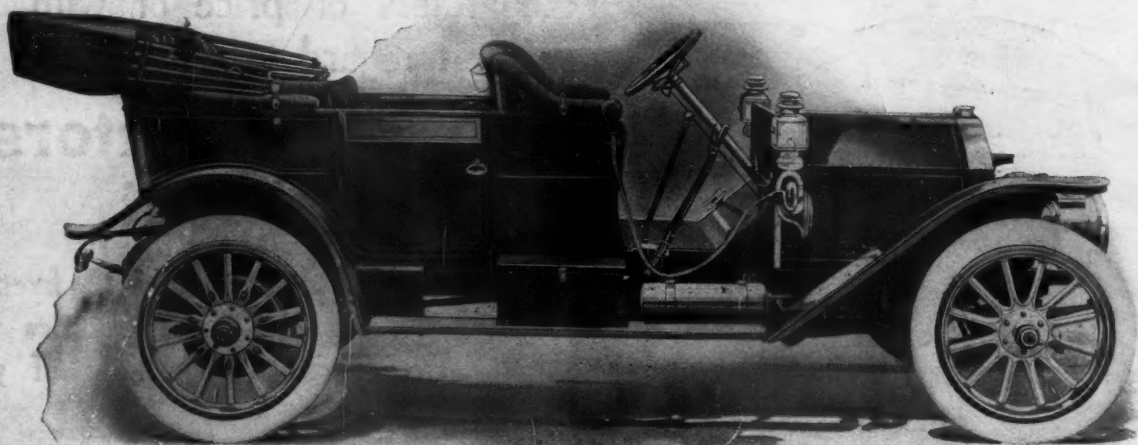
It is impossible to make a better or more efficient Friction Facing than Raybestos. In competitive tests with every known material used for the purpose, Raybestos has proven its superiority. We today lead the entire industry in merit and quality. Raybestos has greater wearing life. Possesses the highest co-efficient of friction, is impervious to heat, oil or gasoline and is practically indestructible—every possible feature that you require in Friction Facing is found in Raybestos.

The cost for installing Raybestos is nominal. Any repair shop or garage will line your brakes quickly and easily—if you specify Raybestos. Under no circumstances accept any other lining.

When buying your 1910 car see that it is equipped with Raybestos. If you gently insist the Agent will see that you get your car so equipped.

Royal Equipment Company, 173 Housatonic Ave., Bridgeport, Conn.

Stoddard-Dayton



Model 10-F Touring Car. 50 h.p. Capacity 7 passengers. Wheelbase 128 inches. Wheels 36x4½. Two separate ignition systems, including Bosch Magneto. Price, including 5 lamps, Prest-O-Lite tank, etc., \$2800 (f.o.b. Dayton)

**Made ONE way—in ONE factory—at ONE profit
sold ONE way — at ONE price**

The most generous 7-passenger car extant. Wheelbase increased 14 inches. Part of this increase is utilized in placing the passenger load in such relation to the axles that makes it unsurpassed for easy riding. ¾ elliptic springs rear, instead of semi-elliptic.

Body—as are all Stoddard-Dayton bodies—of reinforced aluminum, with aluminum mouldings, the most durable and substantial body ever built.

Equipped with two separate, distinct Ignition systems, including Bosch Magneto.

Gasoline tank is now placed at the rear, being mounted in curved brackets, symmetrical with the upper part of the ¾ elliptic springs.

Every possible point requiring lubrication, that is not taken care of by an automatic self-contained oiler, has been provided with a grease cup.

Valve-in-head motor,—in all Stoddard-Dayton Models, (and we make it),—possesses simplicity—is getatable—has 20 per cent more power—uses less gasoline—always silent, smooth, speedy,—the greatest of all gasoline motors.

We are makers of cars.

We do not buy engines of other manufacturers (on which they make a profit),—we do not buy frames (on which others make a profit), we do not buy bodies (on which still more profits would be added).

We have our own foundry—forge—make our engines—springs — frames—bodies—make 93 per cent of the entire car!

\$2800

Where some auto “manufacturers” (?) have to include in the price you pay not only their profits and “overhead” charges, but the profits and “overhead” charges of dozens of factories, we have only one “overhead” charge and one profit.

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This is why you pay only \$2,800 for this

Touring Car as against upwards of \$5,000 for cars that in construction and quality cannot possibly be as thoroughly reliable, because made by dozens of makers, instead of being ONE HARMONIOUS, SUCCESSFUL WHOLE.

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